

The Southern Surgeon

Subscription in the United States, \$5.00

Vol. IX, No. 6

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June, 1940

CYSTOSCOPIC PHOTOGRAPHY Preliminary Report

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CYSTOSCOPIC photography is a new development. It should prove valuable in the teaching of undergraduates. With the present classes of more than fifty students, many receive their degrees without ever having looked into a bladder. It is difficult for the urologist to demonstrate cystoscopic views to more than a few students at a time, and even then he cannot be sure that each one sees what he is expected to see. Such pictures should also prove equally valuable in teaching interns and even graduate students. Rare conditions that can be visualized are best reported by means of actual photographs for it still holds true that a good picture is worth more than a thousand words. Moreover, such photographs of chronic conditions will serve as an accurate record for one's own files.

This development was not possible without improved cystoscopic instruments. The late Mr. Reinhold Wappler, working in conjunction with Dr. J. F. McCarthy, perfected a telescopic lens system for use in cystoscopes. This lens system, used in the "McCarthy Pan-Endoscope and Electrotome," is manufactured by the American Cystoscope Makers, Inc. By means of this, it is possible to see with great distinctness the inside of the bladder, the vesical neck and the prostatic urethra.

In order to record satisfactorily what the improved cystoscope made visible to the eye, highly sensitive photographic film was nec-

Colored photographs were exhibited before the Postgraduate Surgical Assembly of The Southeastern Surgical Congress, Birmingham, March 11, 12 and 13.

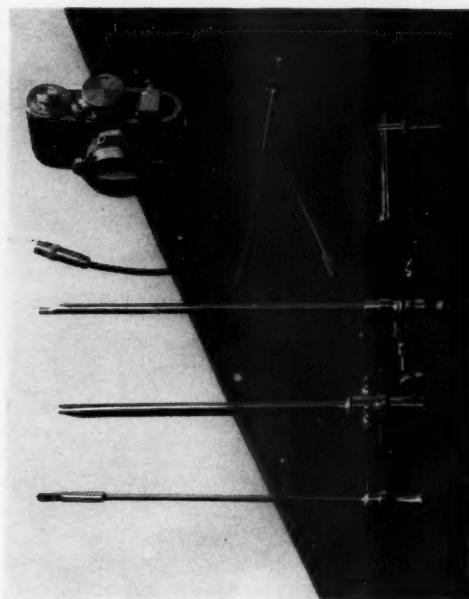


Plate 1. Camera. Shutter release. View finder.
Cystoscope—telescope. Sheath. Obturator.

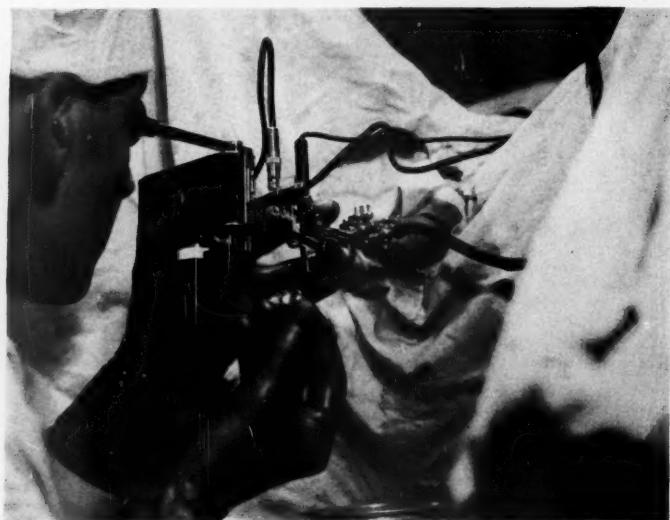


Plate 2. Instrument in use.

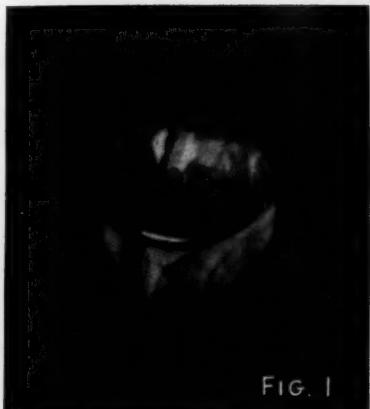


FIG. 1



FIG. 3

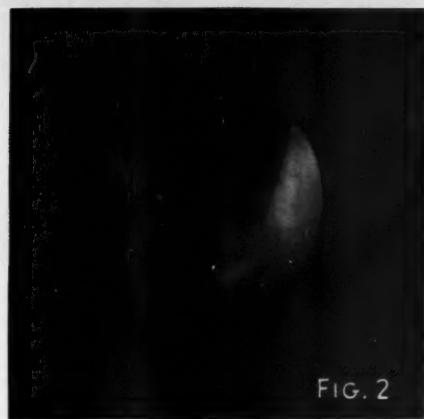
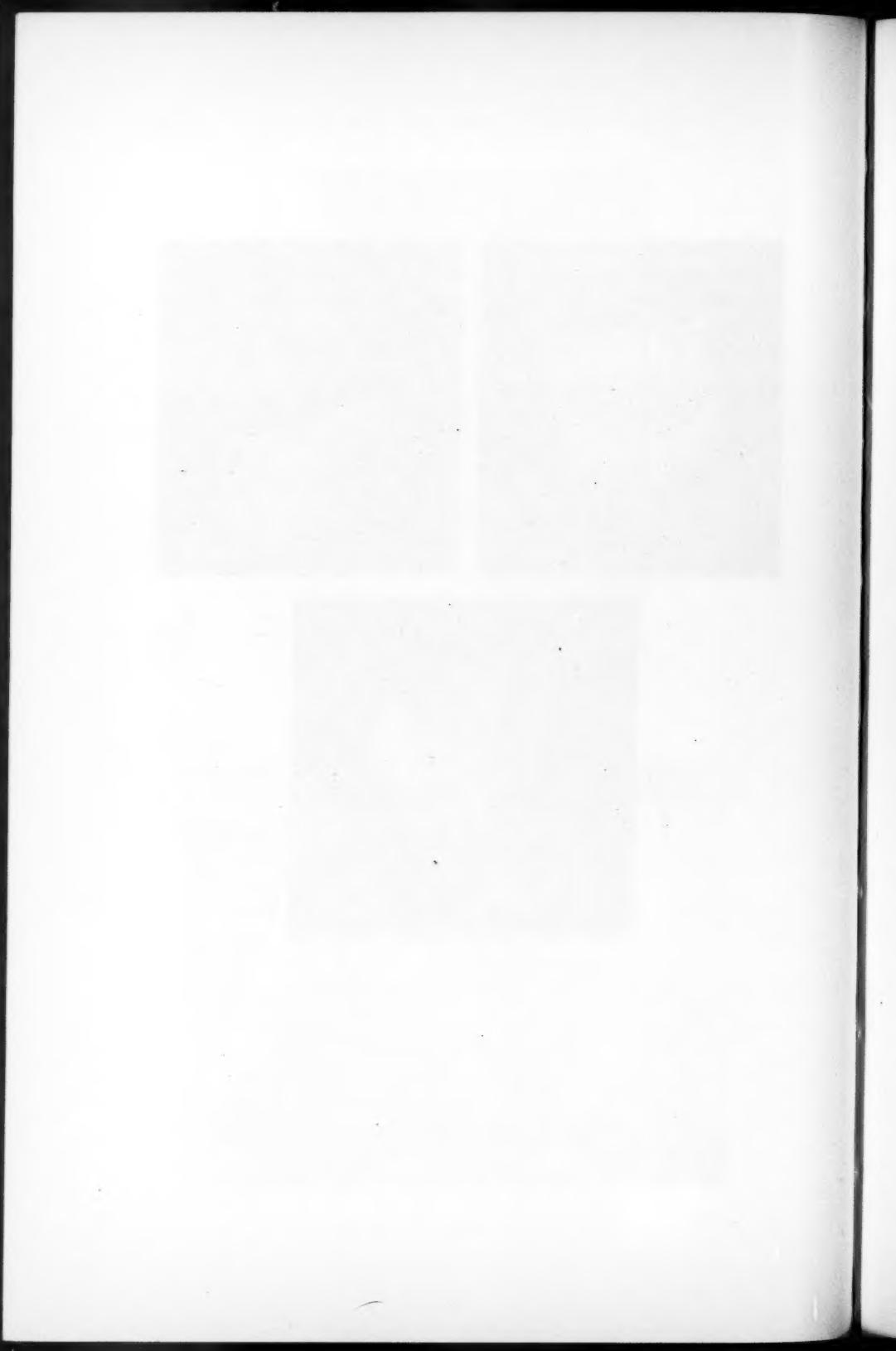


FIG. 2

Plate 3. (1.) Loop of resectoscope against enlarged prostatic mass preparatory to making a cut from before backward. Ordinarily the cuts are made toward the operator. (2.) Groove in floor of urethra after part of prostate has been cut away. (3.) Bleeding arteriole immediately following removal of a piece of obstructing prostatic tissue.





essary. Research has so greatly improved film emulsions in recent years that such highly sensitive film has been made, and the new films developed in the equally new developing solutions can be greatly enlarged without the granular appearance or flakiness that marred enlargements of a few years ago and even without the loss of detail. Moreover color has been added to photography and the accuracy of the colors and their distinctness have been undergoing constant improvement.

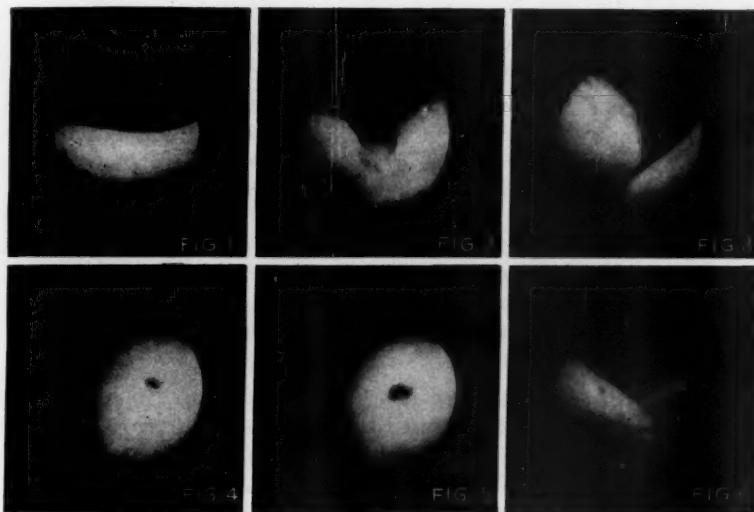


Plate 4. (1.) Vesical neck obstruction, fibrous bar type. (2.) Small lateral lobes. (3.) Enlargement of the left lateral lobe. (4.) Normal ureteral opening. (5.) Ureteral opening slightly dilated. (6.) Enlargement of both lateral lobes.

In order to take advantage of these improvements, Mr. Frederick H. Wappler, President of American Cystoscope Makers, Inc., combined a camera with the cystoscope. He accomplished this by removing the camera lens entirely and substituting for it an adapter that fits the eyepiece of the cystoscope. Through a periscopic view finder, which is also attached to this adapter, the operator focuses on the exact field that he wishes to record. Illumination adequate for the eye is not adequate for photography and therefore a rheostat is thrown into the circuit and so connected with the shutter mechanism of the camera that the light is intensified during the time of exposure.

A model of this camera with its attachments was exhibited before the American Urologic Society last June. We secured the apparatus shortly after the meeting and began making non-color photographs

using high-speed film. Numerous difficulties presented themselves from time to time: chief among these was the time of exposure and the intensity of light necessary for clear pictures. It was found that, the light being as nearly constant as possible, one half to three quarters of a second was the correct time. For such a long exposure a mechanical support is ordinarily used to insure immobility. However, if one is careful not to breathe during the time of exposure, with practice he can learn to hold the camera sufficiently still. With added experience the percentage of successful pictures has increased. We learn from abstracts of the recent European literature that satisfactory black-and-white photographs have been published, especially of bladder stones.

In recent months we have been experimenting with color film (Kodachrome). The first attempts met with failure but by the method of trial and error we have succeeded in getting clear cystoscopic views in color. We believe that the natural colors of these photographs greatly enhance their value. By rephotographing transparencies on color film we have made a movie showing a series of photographs taken through the cystoscope. Such a film was shown by us at the Birmingham meeting in March. So far as we have been able to learn this was the first public showing of cystoscopic photographs in color.

Further experimentation has been required to secure satisfactory paper prints of the colored pictures for purposes of reproduction in this journal. Accompanying this article are three color reproductions and six black and white reproductions of actual photographs taken in this way. At a future date we hope to report a larger number.

SEX ENDOCRINOLOGY AND PELVIC SURGERY

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EVERY new therapeutic aid whether it be a drug or an operative procedure must undergo exacting critical analysis before it is accorded recognition as a consistent beneficial measure. With the development of the various phases of endocrinology have come many fascinating facts and a full quota of hopeful fancies, especially in relation to the subject of sex endocrinology. In spite of the enormous amount of painstaking histologic study, careful animal experimentations, efforts at standardization, scrupulous clinical investigation and concise evaluation by well trained minds, there are still much loose writing, many uncritical therapeutic data and incorrect diagnoses and reasoning concerning the various abnormalities of endocrine function. Perhaps the vastness of the material associated with these conditions is the cause of this confusion. To have thoughts on this or any other subject is well and proper but thoughts, however brilliant, should not get into the medical literature as facts.

Competent diagnosis, an understanding of the disease process and familiarity with the therapeutic agent whether it be x-ray, hypodermic needle, or scalpel are prerequisites for orderly therapy.

Some manifestations of endocrine abnormalities should be treated by endocrine therapy while some are best treated by surgery. Improperly administered products may necessitate surgical intervention and ill advised surgical procedures may require the administration of endocrine products to offset resulting symptoms.

The usual activating symptoms in gynecologic diagnosis are:

- Congenital anomalies
- Irregular bleeding
- Pain
- Vaginal discharge
- Pregnancy and its complications
- Sensation of a mass

The membership of this Congress is thoroughly familiar with the various operative procedures and it is unnecessary to relate technical details. However it might be wise to enumerate the various endocrine products that have been used in the treatment of gynecologic disorders. We will discuss only those preparations that have been used in the Endocrine Division of our service. Our opinion in regard

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Read before the Postgraduate Surgical Assembly (the eleventh annual meeting) of
The Southeastern Surgical Congress, Birmingham, March 11, 12 and 13, 1940.

to production, utilization, metabolism, action and therapy will be based on accumulated data, most of which are included in Hamblen's book.¹

HORMONES

Two products from the ovary have been isolated and are used as therapeutic agents. Both have definite stimulating effects on genital and sex tissue, an effect on the pituitary and thus indirectly other systems and their associated functions.

The estrogens have found use in gynecologic therapeutics in the following conditions: gonorrheal vaginitis in children, senile vaginitis and vaginal hypoplasia, by the induction of cellular proliferation and the deposition of glycogen in the cells; in ulcerative cervicitis, by a similar effect on cervical epithelium; in menstrual irregularities, by its proliferative and growth stimulus to the endometrium; in stimulating growth of myometrium and contractibility of uterus; in mammary hypoplasia, cyclomastopathy and suppression of lactation, by its effect on the primary ductular elements; in hyperfunctional states of the pituitary, by its quantitative and qualitative effects on anterior pituitary secretions, and indirectly in sterility and hypoovarianism through this pituitary effect; in unstable vascular states; and for its synergistic effect on the metabolism of progesterone. Progesterone is used in menstrual irregularities and endocrine sterility because of its ability to induce pregestational differentiation of the endometrium; in dysmenorrhea and threatened and habitual abortion because its effect, antagonistic to estrogen, quiets the myometrium; in the breast it causes growth and proliferation of the alveolar system; its effect on the pituitary is similar to the estrogens and indirectly though the pituitary it may effect cyclic alterations in ovarian function; it helps regulate the vasoconstrictor mechanism of the vascular system; in the metabolism of the estrogens it aids in the conversion of estrons to estriol and helps protect the estrogens from destruction.

The gonadotropes are used for their effect on the pituitary. By depressing the follicle stimulating influence and by stimulation of the luteinizing effect they should be of value in menstrual irregularities, threatened abortion and endocrine sterility; by stimulation of the ovaries and regulation of the ovarian cycle the indirect effect of the ovarian hormones should be manifest.

The following effects have been noted following the use of the androgens; neutralization of the cornification of the vaginal epithelium produced by the estrogens and the disappearance of glycogen from the cells; interruption of the normal endometrial responses to estrogen and progesterone; diminution in the size of the breasts, and suppression of lactation after use recommend them for these

breast complications; by depression of the normal function of the anterior pituitary indirectly they may effect menstruation; effect on the vascular system, especially hypertension associated with climacteric; production of temporary amenorrhea and suppression of menstruation, probably by effecting the metabolism of the other sex sterols and probably an indirect effect through the pituitary.

METABOLISM OF ESTROGENS

Smith and Smith² have reported in detail on the elaboration, metabolism, utilization and fate of the estrogens. They emphasize the importance of qualitative determinations as well as quantitative. They believe that the endometrium is necessary for the complete metabolism of the various estrogens. Greenhill³ summarizes reports and finds that 16 to 55 per cent of women who have hysterectomy undergo menopausal distress even though their ovaries are left intact. Frank⁴ points out that a much greater (five times) amount of estrogen is required to produce bleeding in a amenorrheic uterus than in the castrate. These observations strengthen the work of Smith and Smith.

We have had little experience with the chemical "stilbestrol." Until the metabolism and ultimate effect is reported in detail it should be given with care. Apparently it has many virtues, as shown by the work of Greenblatt,⁵ Geist⁶ and others,⁷ though similar effects have been obtained with the estrogens.

GONADOTROPES

In a series of 87 patients whose endometrium and ovaries were studied for possible histologic alterations following the administration of the various gonadotropes, we found that those with amenorrhea as a symptom or who were in the premenarchal or postmenopausal changes of the tissue.⁸

Sixteen per cent of the patients who had menometrorrhagia as a symptom showed clinical improvement, but the endometrial patterns were those of prolonged estrin effect, and we have not observed cessation of bleeding, the presence of a recent corpus luteum, and a progestational type of endometrium in any of these patients.

In patients with regular menses, we found no effect that could be definitely ascribed to the injected principles.

The anterior pituitary gonadotropic hormone is probably not available in a sufficiently concentrated preparation for general use.

In the group, which received pregnancy urine extract, we cannot escape the thought that the changes noticed are more characteristic of the pregnancy cycle than the menstrual cycle. The work of

Davis and Koff⁹ with pregnant mare's serum is thought provoking. Gray¹⁰ recently has reported a most critical analysis of the effect of this substance. It has the properties of the gonadotropes and is a much more potent substance. However it is an animal protein with evident possibilities of reactions and Rowland and Spence¹¹ present evidence that it forms antihormones.

PROGESTERONE

In a study of the utilization and metabolism of progesterone in women Hamblen¹² found that crystalline progesterone, when administered intramuscularly in oil to women with functional irregularities of uterine bleeding, was inefficiently utilized. Six of the seven patients studied were also unable to utilize efficiently their intrinsic progestin despite the existence of evidence that it was being metabolized normally and the injections in these patients resulted in apparent decreases in their urinary titers of the pregnadiol-complex. These observations suggest that incomplete metabolism occurred. Cellular activity helps explain the metabolism of progesterone as shown by pregnadiol glucuronide determinations of Venning and Browne.¹³ When we consider the variables of production, elaboration, utilization and metabolism and excretions, we see possibilities of deviation. We also see the need of a method whereby the levels of progesterone or its products in the blood can be estimated. Variations occur in the excretion of this product in women thought to have normal menstrual cycles and the relationship to the onset of menstruation is irregular. The excretion is not continuous throughout the pregestational cycle. A single determination is of little value. Immature or markedly hypoplastic endometrium may not be capable of metabolizing progesterone and it seems reasonable that progesterone must be altered before it can aid in pregestational differentiation. The inability to make use of such tests because of expense or inaccessibility is no excuse for failure to use the simpler methods which we know are adequate in most instances.¹⁴

ANDROGENS

Significant information, especially in regard to alterations in the metabolism of estrogens and progesterone, seems highly desirable at this time since there has been begun during the past year a rather widespread use of androgens in the treatment of most functional conditions in women, for which estrogens have been reported to have been of value. Widespread effects have been observed following therapy: cardiac enlargement, alterations in pulse rate and blood pressure, and changes in muscles, skin and vision, also the production of masculinization and enlargement of the clitoris in women who had been treated with androgens.¹⁵

Injections of testosterone propionate, which varied in single doses from 10 to 100 mg. and in number from 1 to 10, resulted in definite elevations of androgenic titers. The recoveries of the androgen injected ranged from 7.6 to 71.0 per cent. Intensive estrogenic therapy of 2 patients caused definite decreases in androgenic titers. The following is a record of titers in patients who had pelvic surgery.

<i>Patients</i>	<i>Operations</i>	<i>Int. Units of Androsterone</i>
5	Hysterectomy and bilateral oophorectomy	18
2	Delayed adolescence and menarche	20
5	Normal menstrual cycles	21
2	Meno-metrarrhagia	26
4	Amenorrhea	45
5	Climacteric	64

Our observations lead us to conclude, as did Callow,¹⁷ that the chief source of the total androgens which appear in the urine is not the ovary but most likely the adrenal. Primary hypo-ovarianism, intercurrent fluctuations in ovarian function, oophorectomy and senility of the ovary do not result in subnormal androgenic titers. These studies of our group, however, do not rule out the possibility that qualitative alterations may occur in androgenic titers following these operative procedures.

DISCUSSION

Most of our efforts and attention have been directed to the pituitary-ovarian relationship and less to the ovary-to-endometrium mechanism.

Many functions have been ascribed to the anterior pituitary and many hormones have been thought to come therefrom. The pituitary is relatively a small organ and contains only several types of cells. It is situated in the middle of the skull where a slight increase in size or deviation from the normal would readily be interpreted in terms of headache, visual disturbances, x-ray findings, physical alterations, blood hormone changes or other recognizable symptoms.

How much simpler the problem would be if it could be shown that the anterior pituitary put out a "universal" or "master" hormone which served all the demands of growth, thyrotropic, gonadotropic, lactation and other pituitary functions. There is a distinct probability that investigators have been "chipping off" portions of a hormone and carrying it in the direction of their research and interest. The alterations of the pituitary by other hormones, by depressing its function and probably by dilution, is more easily understood. It is our belief that the pituitary factor is a fairly constant one. Not so with the ovary. One who inspects the ovaries at the time of

laparotomy is constantly struck with the thought that consistency of ovarian function is remarkable. From a prognostic standpoint, one is more optimistic when one finds some local abnormality as the cause of menstrual irregularities. One would not expect a normal response from an abnormal organ, be the stimulus normal or abnormal. The endometrium is influenced by both the pituitary and the pituitary through the ovary, a fact that we remember in treating menstrual irregularities while forgetting the possible effect of other glands. In therapeutic enthusiasm one is apt to direct all the attention toward pituitary and ovary when, as a matter of fact, the findings in most of the patients point toward exocrine factors, changes in the blood or to the thyroid. More than one wise endocrinologist has audibly or otherwise, been grateful for the thyroid.

INDICATIONS AND TREATMENT

Frank errors of absorption or fusion which require treatment usually require surgery. Hypoplasia of the genitalia, undescended testicles and pseudohermaphrodisim are congenital anomalies that may receive varied treatment. It is a well known fact that the administration of estrogens will produce enlargement of the uterus and rather bizarre effects have been noted following the use of pregnant mare's serum. Surgery in this instance would be meddlesome. One of the few remarkable effects noted after the use of the gonadotropes is the descent of the undescended testicle. If this is not forthcoming surgical replacement may be necessary, but the continued use of the substance will cause enlargement of the testicles which increases the possibility of a cure. In selected cases the androgens may be of value, especially if a virilizing influence is needed. The attitude toward the pseudohermaphrodisim is changing.¹⁸ The individual is encouraged to assert his or her preference in regard to sex and future life. The problem of rehabilitation is greatly facilitated by intelligent conversation, judicious sex endocrine therapy and the use of surgery for cosmetic reasons only. The fear of malignancy or curiosity as to the type of gonad present is hardly cause for operative measures.

Irregular bleeding is a symptom and may be caused by endocrine imbalance, tumors, infection, injury or pregnancy and its complications. In each instance an exact diagnosis should be attempted before treatment is instituted.

Uterine bleeding can be associated with any type of endometrium. Likewise amenorrhea may be associated with any type of endometrium. The lack of menstruation should concern us chiefly in the study of fertility problems or when the symptom has a bearing on associated systems and conditions. The endometrial picture is a

composite one. It is the focal point or sum total of the endometriotropic influences. It is impossible to estimate correctly each of the factors, but a careful and repeated study of the endometrium offers a fairly indicative evaluation of the hormonology of the female. Such a study is equally important in ruling out the endocrine as causative factors in such a symptom as irregular bleeding. By no means should one consider biopsy forceps a substitute for thorough curement. Curement is a diagnostic and therapeutic agent. As a diagnostic measure in functional bleeding it is probably of little value unless it is used just before or within the first eight hours of bleeding, because the tissue shedding is apt to be complete within a relatively short while. Also if done without regard to the cycle, especially if repeated, it is quite possible that thoroughly irregular cycles and epicycles may result. If the patient has profuse and continued bleeding naturally curement is the method chosen to stop the bleeding and remove tissue for diagnosis. The simple expedient of endometrial biopsy or curement has often revealed the presence of infection or new growths and indicated the proper treatment. Failure to use these methods of diagnosis has led to tragedies. Most of us have seen patients with pelvic malignancies and inflammations made hopeless and crippled by the injudicious use of glandular products where adequate study was sacrificed for therapy.

The abnormalities and problems of menstruation in the adolescent are best managed by general and endocrine measures. Time, of course, is a great compensating factor. With intelligent reasoning, adequate but not over zealous therapy and by withholding formidable procedures, the child can be carried through this critical period with few physical or psychic scars.

With the increase in the knowledge of female sex endocrinology and a better understanding of the menstrual irregularities have come conflict and misunderstanding in the therapy, and tedious, costly and complicated paraphernalia in the diagnosis of disorders of menstruation. Most of these patients can be satisfactorily diagnosed and treated by the simple means of adequate history, physical examination, recognition of the usual endocrinopathic stigmas, blood study, basal metabolic rate determination and careful repeated study of the endometrium.

In histologic study of the endometrium we advise the use of some type of biopsy forceps. The type used by Burch or the suction curet of Novak or similar instruments all are satisfactory. One should become familiar with the microscopic picture of material obtained by such methods and should realize that the method may fall short in certain instances. One must not confuse traumatic bleeding with bleeding from therapy. To give exact information the biopsy should

be taken within the first twelve hours of bleeding. It is of great value in checking the effect of therapy.

Hamblen^{19, 20} studied 700 consecutive patients with functional irregularities of the menstrual cycles and correlated clinical data, reviewed and examined all available endometrial specimens secured by hysterectomy, curettage and biopsy. Ovarian tissue was studied when available and if the follow-up records were not adequate, questionnaires were employed. The following scheme was forthcoming from the study and is used by our clinic in classifying endometrial material:

- Hypoestrogenic endometrium
- Normal estrogenic endometrium
- Hyperestrogenic endometrium
- Mixed endometrium
- Progesterational endometrium
- Menstrual endometrium

The hormonal changes influencing the endometrial changes should teach us what to do and, probably more important, what not to do.'

It has been shown by the studies of Schroder, Cullen, Novak and Burch that in "hyperplasia" of the endometrium bleeding occurs from an estrogenic type of endometrium and is probably a dependable piece of evidence of ovarian dysfunction. The exact alteration of ovarian function is disputed. No one has been able to demonstrate excessive accumulation of the estrogens in the body fluids.

Martzloff²¹ thinks the term "hyperplasia of the endometrium" is loosely used. He re-emphasizes the histologic criteria. He expresses the wish that the diagnosis could be put on a mathematical basis and would expect a variation of at least 150 microns between the maximum and minimum diameter of the glands. Moderate variations in the size of the glands cannot be interpreted as hyperplasia without confusion and the accumulation of many inexact data.

A study of 500 patients who had functional bleeding as the chief symptoms. (Hamblen)

GYNECOLOGIC FINDINGS

Retrodisplacement of uterus	131
Enlargement of uterus (small fibromyomas, subinvolution, etc.).....	88
"Cystic ovaries"	66
Pelvic infection (adenitis, congestion, tenderness)	55
One ovary removed.....	14
Lateral displacement of uterus.....	6
Subtotal hysterectomy	4

ENDOCRINE PHYSICAL FINDINGS

Obesity	171	Hirsutism	37
Loss of weight	23	Hypoplasia of breasts.....	68
Low basal metabolism	131	Hypoplasia of external genitalia	40
High basal metabolism	14	Hypoplasia of uterus	46
Thyroid slightly enlarged	97	Persistent juvenile cervico-uterine ratio	29
Goiter (unqualified)	16	Hypertrophy of clitoris	6
Thyroid removed	3	Dwarfing of stature	9
Exophthalmos	1	Diabetes mellitus	7
Myxedema	1	Acromegaly	1
Dry skin	64		
Acne	37		

The above tables are of interest when one considers that all of these patients had "functional bleeding" and were relieved by relatively single procedures. The gynecologic findings associated with bleeding might have been considered as an indication for operation by some, but in no instance would the basic pathology rectified. Surely the chance for a benefit would be much less than the addition to the list of surgically derelicts.

The tabulation of endocrine stigmas reveals a frequent association of such evidence in functional bleeding. Here again one cannot escape the importance of the thyroid gland.

Of all gynecologic symptoms pain is perhaps the most activating.²² The conditions that most often produce pain are infection, dysmenorrhea, pregnancy complications and tumor and their complications. Infection usually requires palliative treatment and by the time that the patient's local and general condition permits operation, the disease process may have disappeared. With the exception of the evacuation of fluctuant masses there is little indication for operation in acute infection. Chronic infection may require removal of organs and an attempt at anatomic restoration.

The use of extracts in combating pelvic infection lacks logic though Sprunt's²³ work carries evidence of some association of the sex sterols with bodily defenses. However premature or injudicious surgery may necessitate the use of hormones to supplement deficiencies caused by removed or injured organs. Bleeding from pelvic infection is more often a diagnostic aid than an indication for immediate operations. It should be recalled that surgery does not cure infection, but simply takes care of organs that have been injured by the process of inflammation.

Some of the earliest gynecologic procedures were devised in an attempt to relieve dysmenorrhea and one of the most recent operations is employed in the same attempt.²⁴

In most instances painful menses is a minor complaint, and it is doubtful judgment to advise a major operation for a minor complaint. The same doctor should have the patient under observation over a long period of time before formidable procedures are instituted. More often than not plastic operations on the cervix and the use of foreign bodies in the cervical canal are productive of more harm than relief. Simple dilatation of the cervix will prove the efficacy of this approach. Naturally, associated lesions should be remedied, but a normal sized movable uterus in retroversion is hardly pathologic.

The operation of presacral sympathectomy is undoubtedly of value in rare selected patients, but one must remember that fatalities and associated visceral alterations have been recorded following this definitely major procedure. The regulated use of various products is warranted. The fact that one seldom finds dysmenorrhea in the hyperestrogenic uterus is significant and leads one to think that a corpus luteum must be a necessary accompaniment in dysmenorrhea. Most of the products have been tried with equivocal results. Our treatment is to give large doses of estrogens about the time of ovulation and "emmenin" by mouth throughout the cycle.

Pain associated with pelvic tumors may require surgical intervention.

In the treatment of abnormal discharge from the vagina one finds an excellent opportunity to make use of every therapeutic approach, singly or in combination. Although infection, irritation, trophic changes and new growths are the basis, it is necessary to employ cultural methods and tissue for biopsy in order to make an exact diagnosis, and to combine all the agents of local medication, glandular therapy, constitution treatment, roentgen ray and surgery in order to effect a cure. The splendid work of Lewis²⁵ and Te-Linde²⁶ in treating the vaginitis in young girls with the estrogens and the employment of the same agents by Davis in treating senile vaginitis stands out as real contributions.

The discussion of the problems associated with pregnancy naturally embraces the matter of fertility. It is not the purpose of this paper to give a detailed outline of the procedures of diagnosis and treatment. Complete information obtained by special questioning and scrupulous examination of both parties is a necessary beginning, to be followed by various special tests. Greenhill²⁷ has given an excellent review of the efficacy of various plastic operations on fallopian tubes that are closed. The preponderance of failures, abnormal gestations and pregnancies that do not go to term make it necessary to give a very frank statement to patients who request operation for sterility due to this cause. Sovak has done splendid

work in handling this complication and his various procedures are most enlightening. By endometrial studies, urinary and blood titers and basal rate tests the endocrine causes can be traced in the female, while repeated sperm counts are indicative in the male. The use of estrogens, pituitary factor and mares serum in hypogenitalism, abnormalities in ovulation and menstruation may be beneficial, and the use of androgens in the male increase fertility. However general measures as to dietary, mental and physical alterations must be instituted.

The use of progesterone in instances of threatened or habitual abortion is of definite value. The determination of the sodium pregnandiol glucuronide is a good index as to the progress of the pregnancy. The metabolism and utilization of progesterone has been discussed. The chorionic gonadotropes also have received favorable use in this complication. The necessity of surgery in incomplete abortion, ectopic pregnancy and traumatic injuries is evident.

The decidual reaction in normal and abnormal uterine pregnancy and in ectopic pregnancy may be conclusive. The detection of changes in the chorionic villi may be life saving.

Pratt²⁸ re-emphasizes the necessity of a careful history in the diagnosis of fundal carcinoma. We all know that a reliable menstrual history is the very rare exception. He offers a simple form that seems to embrace the necessary data and if followed closely should give an insight into the possible cause of irregular bleeding. Bleeding is generally recognized as the most common symptom of cancer of the uterus and continuous flow, especially at the menopause, is particularly suggestive. The relationship of fundal carcinoma to hyperplasia of the endometrium varies with different investigators and different criteria for the diagnosis of each condition.

In a study of some 500 cervical and uterine malignancies we were unable to find an instance of adenocarcinoma of the uterus in a patient who had had both ovaries removed. Nor have we been able to find a reported case where such a carcinoma has developed in the uterus or in the breast later than a year after bilateral oophorectomy.

The relationship of pelvic tumors and tumors in general to the hormones warrants careful and prolonged study. The fact that hormonal formulas are not unlike those of some of the coal tar derivatives which are capable of producing carcinoma in experimental animals suggests that under certain conditions they might be carcinogenic. Lewis and Geschickter²⁹ found high concentrations of estrogens in fibroadenoma of the breasts, also a myoma of the uterus yielded high concentrations of both estrogens and gonado-

tropes.³⁰ Adair³¹ and his co-workers were able to find no increase in the estrogens in fluid obtained from various ovarian tumors. Witherspoon³² advanced the thesis that the fibromyoma is more than a relationship with hypo-estrogenic endometrium and that both conditions may be derived from the same alteration in estrogen concentration. King³³ has often pointed out the more than coincidental association of hyperestrogenic endometrium and fibromyoma of the uterus. Lacassagne³⁴ was able to produce mammary adenocarcinoma in the male rat by the injection of large amounts of estrogen over a long period of time. Overholser and Allen³⁵ found lesions similar to carcinoma in the cervix of monkey after prolonged estrogen injections. Perhaps the summary of Edgar Allen³⁶ is inclusive "it must be made clear that ovarian hormones are obviously not the only cause of female genital cancer, that estrogens normally are very important growth stimulation of female genital tissues and, acting in high concentrations, continuously, may produce decidedly atypical growths and are a determining factor in mammary and uterine cancer." The well known fact that tissue balance and activity in the genitals and breasts are governed largely by sex hormones certainly labels the statement as not extravagant.

The importance of the possibility of the carcinogenic effect of the ovarian hormones is emphasized in the general treatment of carcinoma anywhere in the human body. In the treatment of such tumors as carcinoma of the breast sometimes castration is advisable and evidence favors this practice.^{37, 38, 39}

Thus we see that health may be effected in three particulars: the excessive and continued use of products may cause abnormal tissue growth or might cause recession of tumors, as the disappearance of small fibroids following the use of androgens; secondly the removal of organs entirely or in part may effect the metabolism of injected and secret products; third the removal of secreting tissue may require substitutional therapy. This latter possibility should be uppermost in the mind of the surgeon confronted with the problem of removing ovarian and uterine tissue.

Carpenter⁴⁰ reported on specimens sent from eleven general hospitals and from physicians offices representing one year (1935). Of 2,933 surgical specimens received 1,137 (38.4 per cent) were from the female pelvis. The percentages of gynecologic specimens examined were:

Ovary	322 (28.3%)
Fallopian tube	231 (20.3%)
Uterus	218 (19.1%)
Cervix	193 (16.9%)
Uterine tissue removed by curet.....	173 (16.9%)

In studying these figures one is struck with this inverse ratio. It seems incredible that there should be almost twice as many ovaries as uterine scraping submitted for diagnosis.

The microscopic examination of the ovaries revealed:

Follicular cysts	179
Simple cysts	36
Corpus luteum cyst	33
Chronic oophoritis	32
Hemorrhagic cyst	16
Pseudocystadenoma	6
Serous cystadenoma	3
Cystic adenocarcinoma	2
Krukenberg tumor	2
Fibroma	2
Dermoid cyst	2
Granulosa cell tumor	1

The three most frequent diagnoses total 248—78.9 per cent of the specimens, and these might well be considered normal states of the ovary. The fourth was usually associated with pelvic infection. Carpenter repeatedly has pleaded for an attempt at differentiation between physiologic and pathologic states, by pathologic meaning a lesion the removal of which leaves the patient in an improved state of health.

Taylor^{41, 42} thinks that an ovarian mass under 5 cm. in diameter found before the menopause is so likely to be benign that a period of observation is indicated. This period, with only symptomatic treatment is variable, depending on the severity of the symptoms.

Mueller⁴³ in an attempt to determine the proportion of ovarian tumors, particularly cysts that cause abnormalities in the menstrual cycle, reviewed the findings in 186 cases that had a diagnosis involving the ovary. Of these patients, 102 had normal menses, 17 were past the menopause and 21 were normal except for hypermenorrhea. Only 40 had irregular menses.

As a rule one is able to study these tumors for some months and can separate the inflammatory masses and the physiologic cysts from the true proliferative type. Rarely is one justified in advocating surgery following only one examination. By withholding operation in questionable cases we lower the incidence of piecemeal surgery.

In the event of laparotomy the most important question is what to remove and what to leave. A thorough knowledge of physiology and pathology of the organs under consideration is the answer.⁴⁴ The removal of a sound ovary in the presence of one of the "sex" tumors of the other ovary is not to be condoned. Just so the leaving

of an apparently healthy ovary in the presence of a carcinoma of the other ovary, or of a chorio-epithelioma, is a dangerous omission.

The term "chocolate cyst" originally was used to designate an endometrioma of the ovary but now it is often used in connection with any type or size tumor of the ovary into which bleeding has occurred. The danger of this looseness is obvious. The treatment of endometriosis is dependent upon a knowledge of the hormonology of menstruation, whereas bleeding into a corpus luteum is a physiologic process and usually requires no surgery.

The rationale of surgery of the ovary is a distinct one. If a chronically inflamed appendix is removed the patient may be improved; if found normal, he is not harmed. If the thyroid is secreting an excess or pathologic amount, it can and should be partially or totally removed. However such surgical reasoning cannot be applied to the ovary and uterus. We would probably be nearer the correct approach if we considered surgery of these organs as similar to that of the pancreas and testes. The purpose of gynecologic surgery should be restorative, leaving the individual as nearly as possible a normal functioning female. Unfortunately benign organs that have been removed cannot be replaced, nor can malignant organs that have been left in be satisfactorily treated by roentgen rays.^{45, 46, 47}

All which emphasizes the old surgical homily, operate only when the symptoms and findings demand such a course and, once operation is elected, remove only that which is diseased and leave only that which is healthy.

BIBLIOGRAPHY

1. Hamblen, E. C.: Endocrine Gynecology. Springfield: Charles C Thomas, Publisher, 1939.
2. Smith, G. V. S., and Smith, C. W.: Metabolism of Estrogens in Women, Am. J. Obst. & Gynec. 36: 769-786 (Nov.) 1938.
3. Greenhill, J. P.: Yearbook, Obstetrics & Gynecology, 1939.
4. Frank, R. T.: Female Sex Hormones, New England J. Med. 220: 821-823 (May 18) 1939.
5. Greenblatt, R. B.: Stilbestrol, Bull. Univ. Georgia Hosp. 1: 14 (July) 1939.
6. Geist, S. H., and Salmon, U. J.: Indications for Estrogen Therapy: Including a Preliminary Report on Use of Two New Estrogen Preparations (Estradiol Dipropionate and Diethyl Stilboesterol) and Subcutaneous Implantation of Crystalline Estradiol Benzoate, New York State J. Med. 39: 1759 (Sept. 15) 1939.
7. Dodds, E. C.: Stilboestrol, Practitioner 142: 309-313 (March) 1939.
8. Ross, R. A.: Observations Pertinent to Gonadotrophic Therapy in Gynecology, Am. J. Obst. & Gynec. 34: 780-798 (Nov.) 1937.
9. Davis, M. E., and Koff, A. K.: The Experimental Production of Ovulation in the Human Subject, Am. J. Obst. & Gynec. 36: 183-199 (Aug.) 1938.
10. Gray, L. A.: Effect of Pregnant Mare's Serum Hormone on the Abnormal Ovary, South. M. J. 33: 160-169 (Feb.) 1940.
11. Rowland, I. W., and Spence, A. W.: Production of Antigonadotropic Activity in Man by Injection of Extract of Pregnant Mare's Serum, Brit. M. J. 2: 947-950 (Nov. 11) 1939.

12. Hamblen, E. C.; Powell, N. B., and Cuyler, W. K.: The Metabolism and Utilization of Progesterone Given Intramuscularly to Women, *Am. J. Obst. & Gynec.* *38*: 557-573 (Oct.) 1939.
13. Venning, E. M., and Browne, J. S. L.: Isolation of Water-soluble Pregnandial Complex from Human Pregnancy Urine, *Proc. Soc. Exper. Biol. & Med.* *34*: 792-793 (June) 1936.
14. Ross, R. A.: The Study of the Endometrium as an Indicator, *South. M. J.* *32*: 52-56 (Jan.) 1939.
15. Hamblen, E. C.; Ross, R. A.; Cuyler, W. K.; Baptist, M., and Ashley, C.: Studies in Metabolism of Androgens in Women, *Endocrinology* *25*: 491-508 (Oct.) 1939.
16. Greenhill, J. P., and Freed, S. C.: Virilism in Women Caused by Androgenic Therapy for Menstrual Disturbances, *J. A. M. A.* *112*: 1573-1574 (April 22) 1939.
17. Callow, R. K.: Significance of Excretion of Sex Hormones in Urine, *Proc. Roy. Soc. Med.* *31*: 841-856 (May) 1938.
18. Crossen, H. S.: A Problem of Sex Classification, *Am. J. Obst. & Gynec.* *38*: 123-129 (July) 1939.
19. Hamblen, E. C.: Clinical Correlates of Functional Uterine Bleeding, *South. M. J.* *32*: 308-319 (March) 1939.
20. Hamblen, E. C.: Therapeutic Use of the Sex Sterols in Functional Meno-metrorrhagia, *Endocrinology* *34*: 13-28 (Jan.) 1939.
21. Martzloff, K.: (Discussion) *Tr. Am. Gynec. Soc.* *62*: 70-72, 1937.
22. Ross, R. A.: The Significance of Gynecologic Pain, *South. Med. & Surg.* *99*: 35-36 (Jan.) 1937.
23. Sprunt, D. H.: The Part Played by Age and the Female Sex Hormones in Resistance to Infection, *Endocrinology* *25*: 625-628 (Oct.) 1939.
24. Wetherell, F. S.: Intractable Dysmenorrhea, Read before American Association Obstetricians, Gynecologists & Abdominal Surgeons (Transaction) *47*: 41-53, 1934.
25. Lewis, R. M., and Adler, E. L.: Endocrine Treatment of Vaginitis of Children and Women after the Menopause, *J. A. M. A.* *109*: 1873-1875 (Dec. 4) 1937.
26. TeLinde, R. W.: The Treatment of Gonococcal Vaginitis with Estrogenic Preparations, *J. A. M. A.* *104*: 624-628, 1935.
27. Greenhill, J. P.: Evaluation of Salpingostomy and Tubal Implantation for Treatment of Sterility, *Am. J. Obst. & Gynec.* *33*: 39-51 (Jan.) 1937.
28. Pratt, J. P.: Early Diagnosis of Cancer of the Body of the Uterus, Read before American Association Obstetricians, Gynecologists and Abdominal Surgeons, Transactions *50*: 54-63, 1937.
29. Lewis, D., and Geschickter, C. F.: Estrin in High Concentration Yielded by a Fibroadenoma of the Breast, *J. A. M. A.* *103*: 1212, 1934.
30. Lewis, D., and Geschickter, C. F.: Gonadotrophic and Estrogenic Principles in Myoma of Uterus, *J. A. M. A.* *104*: 45, 1935.
31. Adair, F. L., and Watts, R.: A Study of the Hormonal Content of Ovarian Cyst Fluids, *Am. J. Obst. & Gynec.* *34*: 799-813 (Nov.) 1937.
32. Witherspoon, T. J.: Interrelationship Between Ovarian Follicle Cysts. Hyperplasia of Endometrium and Fibromyomata. Possible Etiology of Uterine Fibroids, *Surg., Gynec. & Obst.* *56*: 1026, 1933.
33. King, J. E.: Endometrial Hyperplasia and Its Relationship to Endocrine Dysfunction, *Am. J. Obst. & Gynec.* *26*: 582, 1933.
34. Lacassagne, A.: Apparition de Cancers de la Mammelle chez la souris male, soumise à des Injections de folliculine, *Compt. rend. Acad. d. Sc.* *195*: 630, 1932.
35. Overholser, M. D., and Allen, E.: Ovarian Hormone and Traumatic Stimulation of Monkey's Cervix to Condition Resembling Early Cancer, *Proc. Soc. Exper. Biol. & Med.* *30*: 1322, 1933.
36. Allen, E.: Ovarian Hormones in Relation to Female Genital Cancer, *Yale J. Biol. & Med.* *10*: 565-572 (July) 1938.
37. Nelson, W. O.: Atypical Uterine Growths Produced by the Prolonged Administration of Estrogenic Hormones, *Endocrinology* *24*: 50-54 (Jan.) 1939.
38. Emge, L. A., and Murphy, K. M.: Influence of Long Continued Injections of Estrogen on Mammary Tissue, *Am. J. Obst. & Gynec.* *36*: 750-768 (Nov.) 1938.
39. Owen, S. E.: Adenocarcinoma of Breast Coincidental with Strenuous Endocrine Therapy, *J. A. M. A.* *112*: 1933-1934 (May 13) 1939.

40. Carpenter, C. C.: The Consideration of Physiology and Pathology in Gynecology, Tr. M. Soc. North Carolina . . .: 236-242, 1936.
41. Taylor, H. C., Jr.: Pathology of Ovarian Hormone with Special Reference to its Role in Tumor Development, Am. J. Obst. & Gynec. 30: 332-349 (Aug.) 1938.
42. Taylor, H. C., Jr.: Symptoms and Treatment of Follicle Cysts of Ovary, Am. J. Surg. 33: 558-565 (Sept.) 1936.
43. Mueller, S. C.: Clinical Significance of Ovarian Cysts, Minnesota Med. 19: 361-363 (June) 1936.
44. Ross, R. A., and Oates, M.: Mechanism of Uterine Bleeding in Pelvic Inflammatory Disease, South. Med. & Surg. 94: 703-705 (Nov.) 1932.
45. Ross, R. A., and Pearse, R. L.: The Incidence of Proliferative Ovarian Cysts, South. Med. & Surg. 100: 371-373 (Aug.) 1938.
46. Hamblen, E. C., and Ross, R. A.: A Study of Ovaries Following Preoperative Administration of an Extract of Pregnancy Urine, Am. J. Obst. & Gynec. 31: 14-29 (Jan.) 1936.
47. Hamblen, E. C., and Ross, R. A.: Responses of the Human Ovary to Gonadotropic Principles, Endocrinology 21: 722-726 (Nov.) 1937.
48. Burch, J. C.: Endocrine Therapy in Obstetrics and Gynecology, Surg., Gynec. & Obst. 70: 503-508 (Feb.) 1940.

SUPRAPUBIC PROSTATECTOMY WITH THE USE OF AN ORIGINAL COMBINATION HEMOSTATIC AND DRAINAGE TUBE

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I WISH to make it clear that the paper here presented is not one of the controversial type which a few years ago flooded the literature and accomplished little except to confuse the issue of prostatic surgery. There has been enough time elapsed since Davis first started his transurethral work for this very excellent operation to be properly evaluated and for it to take its just place in the attack upon obstructive lesions of the prostate.

The vast majority of recognized urologists now believe that either open or transurethral surgery of the prostate may be indicated; and that only after careful study of the individual case should the type of operation best suited be decided upon. The exact percentage of cases done should be determined by the cases seen and the operation which the operator can do best. Naturally, the exact percentage varies; and also naturally there are a large number of cases which can be done either transurethrally or openly with equally good final results.

I wish to present a modified technic for suprapubic prostatectomy which I have found to be extremely satisfactory and which is suitable for any case done by the suprapubic method. It works equally well in the huge prostates in which a resectoscope cannot be introduced and which most of the best resectionists in the country prefer to remove by open surgery, as in the smaller glands that are removed routinely by transurethral operation by the advocates of this method. In passing I wish to state that I personally remove about 75 per cent of the prostatic obstructions seen in my practice transurethrally, and remove the other 25 per cent by suprapubic operation. I do not do the perineal operation. Emphatically, however, I am in no way opposed to the operation when done properly by a thoroughly trained surgeon.

This technic is built around the use of an original hemostatic and drainage tube. This instrument in my opinion possesses a number of advantages, chief among which are:

1. The apparatus is in one piece; both the drainage tube and the hemostatic bag are together.
2. The balloon is of thin rubber which fits into the irregular fossa from which the prostate has been removed considerably better than the former bags of thick rubber.

Read before the Postgraduate Surgical Assembly (the eleventh annual meeting) of
The Southeastern Surgical Congress, Birmingham, March 11, 12 and 13, 1940.

3. The balloon collapses completely and the drainage tube, although large enough to take care of the drainage seen when the technic is carried out correctly, is only size F 40. This enables one to close the bladder and the abdominal wall much tighter than is possible when a large drainage tube is used and in which a hemostatic bag which will not thoroughly collapse is used. This allows the surgeon to approach complete closure and still maintain the margin of safety only obtained when there is adequate suprapubic drainage.

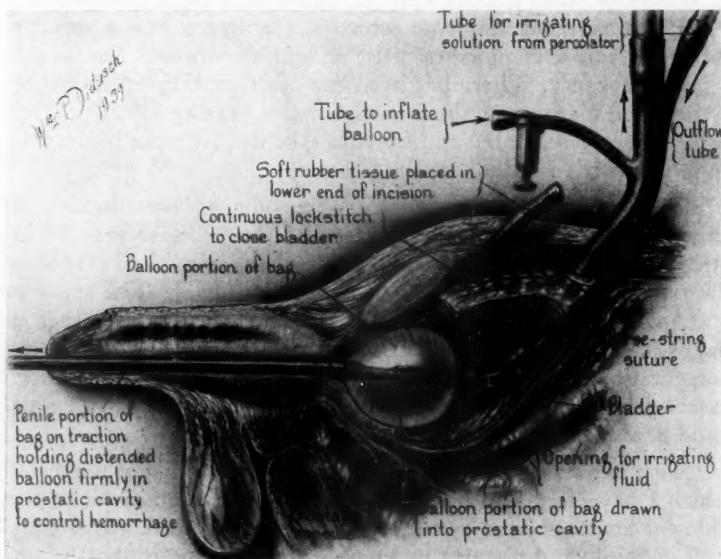


Fig. 1. Diagrammatic drawing showing combination hemostatic bag and drainage tube in position.

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The technic in detail is as follows: A 5 c.c. Foley bag catheter is introduced into the patient's bladder per urethram, the balloon distended and clamped. The bladder is then thoroughly irrigated with a saturated solution of boric acid until the solution returns as clear as is possible. A spinal anesthetic is given; and after the anesthetic takes effect, the abdomen is opened using a midline incision, starting at the pubis and giving plenty of room and usually extending nearly to the navel. I have seen no disadvantage of a large incision. They heal equally well as the smaller ones and give superior exposure. After the skin, subcutaneous tissue, and fascia have been divided, the bladder is fully distended with a saturated solution of boric acid through the Foley catheter. The peritoneal fold is then pushed up from the bladder, being very careful to stay away from the pubic arch as much as possible. This is extremely important. If the space of Retzius is badly disturbed, pocketing will occur and infection is certain.

After the bladder is exposed, it is grasped with two parallel Allis clamps. The bladder is mobilized and an Ockerblad suction trochar is used to enter and drain the organ. The Foley catheter is released at the same moment the Ockerblad trochar enters the bladder. If due care and good technic is used, the bladder can be opened without soiling the other tissues. In order to get rapid healing, this has to be done. Ockerblad's trochar has been extremely useful and is far



Fig. 2. Complete bed assembly. Two gallon percolator connected to inflow tube, five gallon jug for overflow, rubber band tractions to foot of bed.

superior to any of the others which I have seen or used. After all of the fluid is aspirated, the bladder is thoroughly opened and inspected in detail. In my hands I find the triple bladed Judd-Masson bladder retractor and a hand surgical light, which can be sterilized, the best for this purpose.

When the inspection has been completed, the tip of the Foley bag is drawn out through the suprapubic wound and its balloon collapsed. The retractor is removed and the prostate is carefully and

thoroughly enucleated by the intra-urethral method, being very careful to get all of the adenoma and also not to destroy or tear away any more mucous membrane in the bladder and deep in the fossa in the area of the veru than necessary. I do not think it necessary for me to go into detail as to the necessity of doing a clean cut surgical job in the enucleation. I will say, however, that one has to do this correctly as it is at this point where most of the mistakes which cause poor results are made.



Fig. 3. 5 c.c. Foley bag in position after combination bag has been removed. Note that hole has been pierced in the mattress and the drainage is dependent.

The retractor is then reintroduced and the new orifice thoroughly inspected. Loose tags are cut away and the spurting vessels which can be easily found are ligated. No particular effort is made to find them; and in most cases, no ligation is done. The tip of the urethral portion of the hemostatic and drainage tube is attached to the tip of the Foley bag by invaginating the Foley tip within the lumen of the drainage tube and passing a suture through both of them. The hemostatic and drainage tube is then drawn down into the bladder by having an assistant draw the Foley catheter from the urethra. Before the balloon portion reaches the fossa, it is distended with about 50 c.c. of sterile water, a larger or smaller amount can be

used according to the size of the gland removed. The balloon is distended before being drawn into the fossa in order that the action of drawing it into the fossa may pull in the loose edges of mucous membrane and put the maximum pressure of the distended balloon against the site of entry of the large blood vessels which supply the prostate.

In my earlier cases, I partially distended the bag, drew it deep into the fossa and completed the distention. This method is per-

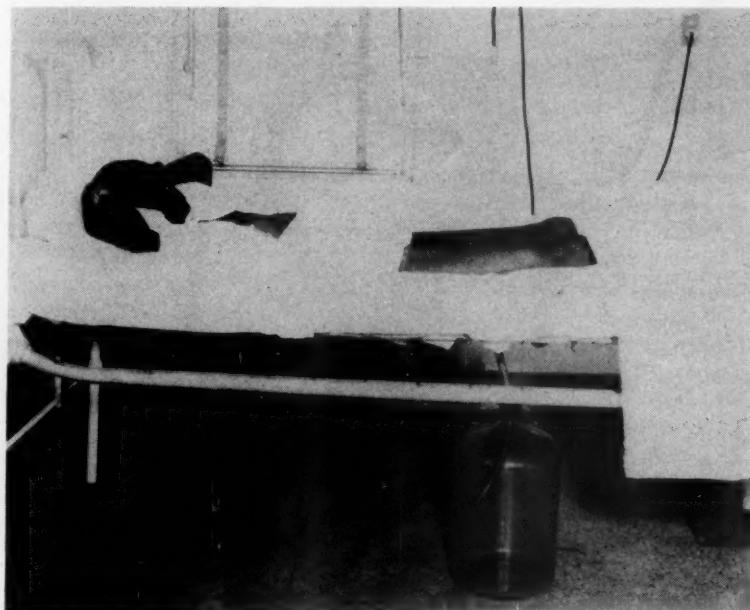


Fig. 4. Illustration showing method of collecting urine by use of pierced mattress and drainage receptacle under bed.

fectly satisfactory, but, I have found from experience, causes more pain. It is my custom now to use the technic first described; and although there is occasionally some slight bleeding along the urethral portion of the bag coming out through the penis, I have found no cause for alarm. This bleeding can be easily controlled if it amounts to enough to speak of by a snug roller bandage about the penis kept in position for a few hours.

Flocks, in his monumental work upon the blood supply of the prostate, thoroughly demonstrated that the large blood vessels which supply the adenoma enter on either side near the bladder edge at the points indicated in fig. 5.

The blood supply of the capsule is not interfered with by a properly done enucleation; therefore, the bleeding that does occur in the deep portion of the fossa necessarily is from only small vessels.

After the bag is in position and the bleeding controlled, the bladder is sponged clear and the bladder wound closed, bringing the drainage tube out of the upper angle of the wound. The bladder is closed by a continuous lockstitch of No. 2 chromic catgut which includes the entire thickness of the bladder and then forms a purse

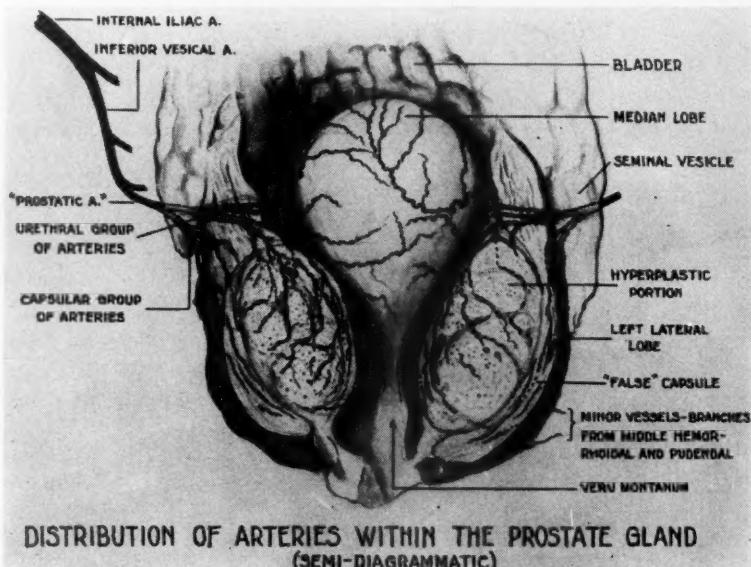


Fig. 5. Flock's diagrammatic drawing showing circulation of prostate. Note that the blood supply of the hypertrophied gland is at the vesicle edge and that the blood supply of the true prostate or false capsule is an entirely different branch.

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string suture about the drainage tube. This line of sutures should be placed very carefully and the space between the individual stitches should be small as a water tight closure is necessary for success of the technic. One should not hesitate to use considerable traction on the bag to control the bleeding. Rubber bands are tied to the tip of the clamped portion of the apparatus that has been drawn through the urethra and gauze tape is tied to the bands. Traction is maintained in the operating room by hand and later in the room by fastening the gauze tape to the foot of the bed.

After the bladder is closed, the wound is closed in layers, being certain to use interrupted sutures in the fascia. A small Penrose cover drain is left in the lower angle for twenty-four hours, and a

double figure-of-8 mattress suture of stainless steel wire, using small sections of rubber tubing to prevent cutting, is placed about the drain. This suture is not tied, and is to be used later when the apparatus is removed to collapse the sinus and hasten its closure.

When the patient is returned to his room, the inflow tube is connected to a two gallon percolator; and the overflow is connected to a soft rubber tube leading to a five gallon jug of clear glass beside the bed. The traction, as before stated, is maintained by fastening the gauze tape to the foot of the bed, putting the rubber bands on considerable tension. Irrigation is commenced at once and is continuous until the return flow is perfectly clear for some little time.

The advantage of having a five gallon overflow jug of clear glass is easily seen. One can readily see the amount of bleeding and also the jug does not have to be emptied at frequent intervals.

The period of time of continuous irrigation ranges between twenty-four and thirty-six hours. It should be kept up until the solution has been clear for twelve hours. The firm traction to the foot of the bed should be released slightly in about eight hours, and to a great extent when the solution returns clear. Gentle traction should be maintained about forty-eight hours after the bleeding has stopped. The balloon is then collapsed, but the apparatus is kept in position by gentle traction to the foot of the bed. If bleeding should start up again, the bag is reinflated and the traction and irrigation recommenced. After the solution is clear, three or four thorough irrigations a day, using a saturated solution of boric acid or plain sterile water, is all that is necessary.

On the sixth or eighth day, if everything is satisfactory, the apparatus is removed through the suprapubic wound, drawing in a Foley 5 c.c. bag catheter and distending it. Just before this is done, it is a good idea to soak the portion of the instrument which has come down through the urethra in a 1:1000 cyanide of mercury solution for thirty minutes.

After the apparatus has been removed and the Foley bag placed in position, the stainless steel mattress suture is tied, collapsing the suprapubic sinus. Dependent drainage can be best obtained by cutting a hole through the patient's mattress and connecting the Foley catheter to a tube which runs through the mattress between the patient's legs to a jug under the bed. The suprapubic wound will not heal rapidly if dependent drainage is not maintained. Small lumen catheters have a tendency to become encrusted and obstructed when left in the bladder.

It is extremely important to have the Foley catheter gently but thoroughly irrigated several times each day and each night, using

enough solution to enter the bladder, thoroughly cleansing the catheter, but not enough to force its way through the suprapubic sinus. An excellent solution for this purpose is 1:10 of 1 per cent acetic acid in sterile water.

When the outlined technic is used and all of the details are carried out carefully, most of the patients have an uneventful and rapid convalescence. I have had one patient to complete the entire procedure in twelve days. The average, however, is longer, usually about eighteen. I have had no serious complications so far, but the usual complications associated with the operation should be expected.

The question of late postoperative bleeding after the suprapubic sinus has been closed naturally arises. I have had this occur in one case. I controlled it by introducing a resectoscope, evacuating the blood clots and then fulgurating the bleeding point; an Alcock transurethral hemostatic bag was left in place for a couple of days. The technic is exactly that used when bleeding occurs late in cases of transurethral resection.

The hemostatic and drainage tube can be used equally well in cases which are best suited for the two stage suprapubic operation, it being only necessary carefully to dissect out the bladder edges in order to get a water tight closure in the second stage.

Finally, we have been tremendously impressed with the value of blood transfusions in these old men. At best, most of them are below par. A single 500 c.c. transfusion is given to all my poor risk prostatic patients regardless of whether the operation is transurethral or suprapubic, if possible, the afternoon of the operation; and several more later if indicated.

The above technic is presented with the hope that it will be of service to others and is not intended to discredit any other surgical procedure.

POSTOPERATIVE PULMONARY COMPLICATIONS

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INCREASED efficiency of aseptic technic, development of surgical skill, and the marked recent improvement in anesthesia, have by their combination made the average operation safe, and removed the fear and dread of surgery. Secondary hemorrhage, surgical shock, and peritonitis in a clean case are catastrophes that are now rarely experienced. The successes attending the invasion of the frontiers of medical science have been startling, and of incalculable benefit to the human race.

While we as surgeons are justly proud of what progress has been made in the reduction of mortality rates, there are still areas of the human body, notably the lungs, where sudden and unaccountable calamities occur with unabated frequency.

It can make no difference to the individual patient who is the unhappy victim of a serious and perhaps fatal complication, whether the blow strikes in the abdominal or thoracic cavity. It is the purpose of this paper to direct the attention of this body to the prevention and perhaps the elimination of pulmonary complications, a field not heretofore sufficiently invaded.

Most pulmonary complications following operation are wholly unexpected, and many are swift and tragic in their appearance. Statistics as to the frequency of occurrence naturally vary in different hospitals and clinics. I am firmly convinced that this difference is not due to any great variation in surgical or anesthetic technic, or to any inclination to withhold the facts, but is due to incomplete records and failure to obtain an autopsy in every fatal case.

Many of the unexplained sudden deaths are due to some pulmonary complication. In the order of their severity they are bronchitis, pleurisy, atelectasis, infarct, pneumonia, pulmonary abscess, pulmonary embolism. Lack of space prohibits the discussion of any except the most serious. The development and management of pneumonia and pleurisy are complications so well understood they will only be mentioned. The likelihood of postoperative complication increases in direct proportion to the seriousness of the operation.

A careful study of the reports from various well-known institutions, and a complete analysis of the records in two of our Louisville

Read before the Postgraduate Surgical Assembly (the eleventh annual meeting) of The Southeastern Surgical Congress, Birmingham, March 11, 12 and 13, 1940.

hospitals where I am on the active surgical staff, show the incidence of such complications to vary greatly.

A conservative conclusion places postoperative pulmonary complications as occurring in from 2 to 4 per cent of all major surgical operations. When operations on the upper abdominal regions alone are considered, this figure rises to 10 per cent and higher. The mortality from the same cause is given as 0.6 per cent, or one in every two hundred cases.

King¹ in reviewing a series of surgical cases which he studied at the Massachusetts General Hospital over a period of two years, reports that postoperative pneumonia, pneumonitis, or collapse occurred in 6 per cent of the total number, 14 per cent of the cases in which a laparotomy or herniotomy was done, and 7.2 per cent of those in which a thyroidectomy was performed. Trueta Raspell,² speaking of upper abdominal operations, concludes that of patients with a normal vital capacity, 2 per cent have pulmonary complications following operations, while of those with a lowered vital capacity, 72 per cent develop such complications.

Until recent years, we accepted the theory that nearly all post-operative pulmonary complications were pneumonia, and that it was mostly due to the chilling effect of ether on the lungs. In addition to this, it seemed logical to accept the theory advanced by Lemon and others³ who showed that the lungs and bronchi are thoroughly drenched by secretions from the mouth and nasal pharynx during a brief ether anesthesia. Bacteria and other particulate matter inserted into the mouth of an etherized dog were subsequently recovered from the extreme periphery of the lung at autopsy.

These ideas have now in a great measure been abandoned, for the general use of local and spinal anesthesia have not reduced the incidence of pulmonary complications, and further, a more frequent radiologic study of the lungs when pulmonary symptoms present themselves, and a higher percentage of autopsies in the fatal cases, have proved that pneumonia is not the real trouble in a large percentage of cases.

The first table is from our cases at the Louisville City Hospital. This study was confined solely to abdominal surgery, and did not include prostatic surgery or herniorrhaphy, both of which usually show a higher percentage of pulmonary complications. You will note that the percentages here are somewhat lower than the average, but these were all proved cases with nothing taken for granted, and do not include minor complications, nor do they include those cases with diseased areas in the lung parenchyma in which death was attributed to some other cause. It has been suggested that this favorable comparison with some private institutions may be due to

the fact that none of these patients have private nurses, and that they early begin to move about the bed and wait on themselves.

TABLE 1

UNIVERSITY OF LOUISVILLE, LOUISVILLE CITY HOSPITAL
1000 Cases Abdominal Surgery

Pulmonary Complications (Minor Complications Not Noted)	
Upper abdomen	174
Pulmonary complications	7—4.02%
Lower abdomen	826
Pulmonary complications	14—1.69%

TABLE 2

LOUISVILLE CITY HOSPITAL

POSTOPERATIVE ORDERS FOR PREVENTION OF PULMONARY COMPLICATIONS

1. Deep inhalations of helium 65%, oxygen 35% at close of operation.
2. Elevate foot of bed for two hours.
3. Deep breathing and change of position every two hours.
4. Oral care t. i. d.
5. Strychnine sulfate gr. 1/40 q. i. d.

These measures are used routinely, but are particularly indicated for obese patients and all past 40 years of age.

At Norton Infirmary in the Surgical Division, 685 cases were reviewed. These were all major operations, and no minor pulmonary complications were included. There were 103 cases in the upper abdomen with 10 complications, a percentage of 9.7 per cent. There were 578 lower abdominal cases with 19 pulmonary complications, and a percentage of 3.28 per cent. Of these 29 cases, 19 recovered and 10 died. Three autopsies were performed. These figures correspond with the general average over the country, and are certainly high enough to demand a serious consideration.

TABLE 3

NORTON MEMORIAL INFIRMARY

Pneumonia	8
Pulmonary abscess	1
Atelectasis	6
Phlebitis with Pulmonary Symptoms	2
Embolism	5
Pleurisy	3
Infarct	2
Pneumothorax	1
Bronchiectasis	1

Many of these were clean uncomplicated cases until the pulmonary symptoms developed. Please note that only two cases of thrombophlebitis showed pulmonary symptoms. It has been shown that many of the so-called cases of bronchitis and pleuritis that are often dismissed with the statement to give an aspirin tablet and put the hot water bottle to the side are really cases of infarct, and sometimes give rise to a serious complication.

Factors influencing the production of postoperative pulmonary complications may be divided into 1. the patient himself, 2. pre-operative care, and 3. care in the operating room.

1. THE PATIENT HIMSELF

A study of the patient himself shows sex plays no important role. Everything else being equal, about as many men are affected as women. One race is about as susceptible as another, except some believe that Jews are not quite as prone. Age is an important factor, 60 per cent occurring in people over 40. Pneumonia and empyema of course are frequent in children, embolism being rare. One of my own cases, however, was in a young man 18 years of age. Weight was shown to be a factor in every report studied, obesity usually favoring the development of chest conditions. The morale of the patient is a factor that should not be overlooked. If he is morose, depressed, listless, his resistance is unquestionably lowered. A cheerful attitude and bright outlook should always be encouraged. Duration of illness, sepsis, and extent of operative procedure are factors all so obviously influencing the production of pulmonary complication, they need only to be mentioned.

2. PREOPERATIVE CARE

Extrinsic influences lead directly to the production of atelectasis, and play some part in the development of every pulmonary complication. Preoperative preparation, therefore, is all important, and may be the deciding factor in the peaceful convalescence of your patient. Some essentials are a. rest for the subnormal heart, b. food and fluids for the debilitated patient, and c. elimination of fear as far as possible, and the creation of an atmosphere of hopefulness.

3. CARE IN THE OPERATING ROOM

In the operating room we consider the anesthetic, the type of operation, and the length of time. In our series of 1000 cases, spinal anesthesia was used in 757, cyclopropane in 127, ether in 56, local anesthetic in 39, cyclopropane and ether in 20, nitrous oxide in 1. The percentage of complications shows a decrease of 0.5 per cent since the general use of spinal anesthesia. Since a few whiffs of helium are now used just before the patient leaves the table in all

cases of inhalation anesthesia, our anesthetists believe they have found the preventive par excellence. Helium is a much heavier gas, lasting longer and more effective in preventing any degree of collapse. It is yet too soon to present any proof derived from its use over a long period of time.

Next to the anesthetic, the type of operation itself is of the greatest importance. Operations on the gallbladder and stomach, and particularly operations for perforating gastric ulcer, show a high percentage of complications. Gentleness in handling tissues, avoidance of muscle splitting, care in ligating veins, restriction of excessive suture material, and particular pains to avoid trauma in the region of the large abdominal plexuses, which the late John B. Deaver termed the "abdominal brain," are all precautions well worth our observance.

Reports from different hospitals show almost without exception that the length of time of the operation is often the deciding factor. Prolonged operations regardless of the kind of anesthetic reduce the vital capacity and remove the obstacles to the development of pulmonary complications.

ATELECTASIS

William Pasteur in 1890 was the first to describe atelectasis, calling attention to pulmonary collapse following diphtheria. In 1910 the first case of postoperative atelectasis was recognized clinically, also by Pasteur. Scott, in 1925, in a complete study of the literature found only 64 cases reported; these included cases which were not postoperative. Previously often misnamed postoperative or ether pneumonia, atelectasis has been recognized with increasing frequency since 1925 as a common pulmonary complication following operations, so that now it is variously estimated as comprising from 20 to 70 per cent of all postoperative pulmonary complications.

Atelectasis may be defined as the collapse of a lung or portion of a lung in such a manner that the affected portion contains little or no air, and is greatly decreased in size.

In a brilliant address before the New York Academy of Medicine in November, 1935, Dr. Yandell Henderson⁴ in speaking of atelectasis, made the following observations:

The lungs are peculiar organs in that they have little independent activity or self-regulation. Their activity is mainly determined and controlled by influences outside the lungs themselves. A muscle can be taken out of the body and made to contract. The heart can be excised and kept beating. The kidneys likewise, if perfused, will function independently of the rest of the body. But the lungs, once out of the chest and separated from the heart, are mere masses of tissue devoid of activity.

If this represents the normal physiology of the lungs, then it is perfectly logical to believe that the abnormal physiology, particularly atelectasis, may be directly due to some extrinsic influence.

To quote again,

Of all the influences upon the lungs involved in the development of post-operative atelectasis and massive collapse, by far the most important is that of the size of the muscles. The intercostals, scaleni and levators, which lift and spread the ribs, play a considerable part. But it is the diaphragm that by its contraction and relaxation is the main factor in variations in the size of the thorax; and these variations extend from maximal inflation of the lungs down to atelectatic deflation.

The expression "paralysis of the diaphragm," which was formerly common, we now believe to be an overstatement, because the restricted respiration is due to a lack of muscle tone, and is present in a greater or lesser degree following every operation. Dr. Henderson used the illustration that posture, or the ability to stand erect and hold up one's head, is dependent on muscle tonus. To quote further:

In the depression of vitality that follows long anesthesia and extensive surgical operations, the chest cavity is so much decreased that the lungs are nearly deflated. A healthy man under normal conditions has more than twice as much air in his lungs as a corpse. It is probable that from the first breath of life until after the last, the diaphragm is never completely relaxed.

When the vital capacity is reduced, the tonus of all the muscles in the body is diminished. With this occurs the reduction in the size of the thoracic cavity, and a depression of the lungs produces many minute de-aerated areas. If we accept this theory, it is obvious that obstruction of the main bronchus is all that is needed to include all the factors necessary for the production of a massive collapse. When a main bronchus is occluded, it is followed by rapid absorption of the air in the distal part of the lung, resulting in atelectasis.

Many different opinions are held as to the etiology of atelectasis, but it seems quite evident that although the obstruction of the main bronchus is the one essential, there are many factors that enter into its production. Infection in the upper respiratory tract, coryza, sinusitis, laryngitis, and bronchitis are all activating causes. Debilitated patients, septic cases, those that have been a long time in bed from fractures or other causes, are all preoperative conditions that decrease muscle tonus, thereby favoring the production of atelectasis. Thin secretions will enter minor bronchi, producing patchy atelectasis, while thick viscid secretions plug large bronchi, causing the collapse of a complete lobe or more. In certain cases other preoperative conditions such as over exertion, food poisoning, etc., may

so disturb the metabolism and reduce the muscle tonus that the patient is an easy prey to a collapsed lung.

A 42 year old woman with an uncomplicated fibroid tumor presented herself for operation. Between the time of the examination and the day scheduled to enter the hospital, she was the victim of food poisoning with violent diarrhea and vomiting. Before her system was entirely free from the effects of the toxemia, the operation was done, followed by a rapidly developing atelectasis, which involved the entire left lung.

One extremely hot Sunday last summer, a strong vigorous young man played tennis hard all day. He stopped only long enough to eat two cold sandwiches and drink six bottles of a soft drink for lunch. During the day he drank a gallon and a half of ice water. At 6 p. m. he ate a very hearty dinner, and went to bed feeling well, except tired. He was awakened at 1 a. m. with a severe pain in the abdomen, and came to operation the next morning, a gangrenous, extremely inflamed appendix being removed. He developed slight cyanosis on the table. This cleared somewhat for about four hours, but returned with a rapid respiration, fast pulse, and a rise in temperature. He presented the typical textbook picture of a well developed postoperative atelectasis.

From our series of eight recent private cases, I mention these two, because it is interesting to endeavor to find the main factor in the production of the atelectasis.

The sudden upset, the disturbed metabolism in both cases was undoubtedly sufficient cause for the interruption of an otherwise normal convalescence. Had the operation in the first case been postponed a week or ten days longer, until the patient had completely recovered, it is reasonable to believe that her vital capacity would not have been seriously disturbed by the major operation. The somewhat longer length of time on the operating table of the first case, due to perineal repair, combined with the preoperative intestinal upset, and in the second case the marked overexertion, prolonged physical exercise in the extreme heat, with the ingestion of an excessive amount of cold fluids, all combine to add evidence to the theory of decreased muscle tonus.

Preoperative medication is of importance. Morphine tends to diminish the cough reflex and depress respiration, and should not be given in large doses. Atropine decreases the buccal and bronchial secretions, rendering them more viscid and difficult to remove. It tends also to increase intrapleural pressure as does epinephrine.

The position of the patient on the table has a direct bearing on the production of atelectasis. If the operation is necessarily long, then the position of the patient should be changed. Particularly is this true if the patient is lying on one side or the other, as this position favors the gravitation of mucus and its lodgment in a bronchus.

The incidence of atelectasis in operations on the upper abdomen is a subject for much study and consideration. Herniorrhaphies and thyroidectomies are also operations that atelectasis seems to follow with too great a frequency. Following the operation it may be pain, excessive narcosis, adhesive that is too tight, or nervous tension due to fear, that causes shallow respiration, thus favoring atelectasis.

Atelectasis usually develops early postoperatively, or may begin on the operating table. Its onset is a striking phenomenon, and is manifested by a rise in temperature, pulse rate and respiration. There is a sense of pressure, pain in the chest, slight cyanosis, dyspnea, and a mucopurulent sputum. Increase in respiratory rate without the other symptoms is always suspicious. The more sudden the onset, the more severe the symptoms. Prompt diagnosis is essential in that the condition may be relieved before infection develops. This is usually not difficult with the aid of the radiologist. The cyanosis, increased respiratory rate, and the positive x-ray findings are sufficient for the diagnosis. The trachea and heart are pushed toward the affected side, while in empyema and pneumonia, we see the opposite. When the clinical signs appear within 24 to 48 hours following a major operation, it is not wise to wait for x-ray confirmation, but relief measures, particularly postural drainage, should be instituted at once, says A. E. Moore.⁵ When the patient moves or coughs, dislodgement of the plugs of secretion may occur with the resulting sudden disappearance of all signs.

In bilateral and patchy atelectasis, the diagnosis from pneumonia is not always easy. Coryllos and Birnbaum⁶ believe that pneumonia and atelectasis have a common basis. Bowen⁷ estimates that probably 70 per cent of cases of so-called postoperative pneumonia are actually cases of atelectasis.

As specialists have become more skilled in the use of the bronchoscope, these cases are more easily handled. If the mucus plug can be located and dislodged, the beneficial effect is phenomenal, and we have a prompt return of the normal roentgen picture. In all cases that do not clear up promptly, and in doubtful cases where for any reason the diagnosis is delayed, oxygen and carbon dioxide are used continuously.

With the existence of acute infections of the upper respiratory tract, such as laryngitis, influenza, infected tooth socket, and bronchitis, all major operations except emergencies should be postponed. All acute abdominal conditions should be operated under spinal anesthesia. Prolonged operations or one position of the patient either during or after operation maintained for a great length of time are very conducive to development of atelectasis. If by necessity the operation must take a great length of time, then the position

of the head and shoulders of the patient should be changed at intervals. Cleansing of the nose and throat of mucus or vomited material by the anesthetist is of great importance. Balfour and Gray⁸ point out the importance in operations for gastric conditions of emptying the stomach by tube to prevent the sucking out of gastric contents which may be aspirated as they roll out of the mouth. Dental sepsis and caries have probably not received as much attention as they deserve.

As a prophylactic measure in addition to those mentioned, such as oral asepsis, postural drainage, cleansing of the throat, etc., all anesthetists favor some form of hyperventilation. Some give pure carbon dioxide, administered by means of an open mask. The inhalation is given for only a few minutes, and is limited to two or three liters per minute, mixed with inhaled air. Charles W. Mayo⁹ advises the use of pure oxygen given by a mask at frequent short intervals.

Postoperative atelectasis can be prevented, and if recognized early can be successfully treated. Certainly a condition that occurs in from 2 to 20 per cent following all major operations deserves our closest study and consideration. The indications as to treatment are very clear. All we have to do is to remember the surgeon's well-known axiom—"A well-drained infection is relatively harmless; an occluded infection is always dangerous."

The mucus that occludes the bronchus should if possible be removed. This is very frequently done by the patient's own efforts at coughing. In some cases a bronchoscope should be tried. Frequent turning the patient, loosening the top of the abdominal dressing, reduction in the amount of morphine given, are all measures of great importance. If it is possible to remove the bronchial secretion before infection develops resulting in pneumonia, abscess, or gangrene, recovery is usually prompt. Deep breathing, coughing, striking the chest with the fist, and blowing in a bottle will frequently serve to reestablish the flow of air to the lung.

Like most other surgical conditions, the early recognition of atelectasis is of supreme importance. It is almost a question of pure mechanics before edema of the bronchi and infection take place. If not recognized early, all measures will fail.

PULMONARY ABSCESS

Pulmonary abscess is not a frequent complication following abdominal operations. It will be seen from our series from both hospitals that the percentage is about the same, one in five hundred cases. Donald S. King¹ in reporting 210 cases of pulmonary abscess states that 64.7 per cent of the cases were referable to a previous surgical procedure, but 56 per cent followed tonsillectomy. Most

reports claim that at least 30 per cent follow operations on the throat. In contrast to atelectasis, pulmonary abscess is a late complication, and most often occurs in septic cases. Our conception of pulmonary abscess depends on whether we accept the aspiration theory or that of infected emboli as the causative factor. It seems obvious that since such a large percentage of pulmonary abscesses follow throat operations, and since it is mostly the septic abdominal cases in which abscesses occur, that aspiration into the bronchial tubes is the avenue of infection in the throat cases, and that in practically all abdominal cases, the infection reaches the lungs through the blood stream and lymphatics. This suppurative process often begins in the lung on a small embolism.

The case illustrated is that of a man 50 years of age, who following a cholecystectomy had a large superficial abscess posteriorly on the left side just below the angle of the scapula. This was followed four weeks later by a large pulmonary abscess and gangrenous condition of the left lung. He was treated with the bronchoscope and conservative management for two weeks, and then a two-stage operation was done.

The diagnosis is usually made by the high temperature, foul sputum, and definite findings by the x-ray. The bronchoscope is invaluable as a diagnostic agent, its greatest value in skilful hands being the accurate localization of the abscess.

The course of an abscess often cannot be predicted exactly from clinical symptoms.

James Maxwell¹⁰ reported 199 cases of lung abscess, 38 of which followed an abdominal operation. Sixteen of these showed bronchopneumonia, 2 lobar pneumonia, and only 1 an obvious infarct. Cutler and Hunt¹¹ have reviewed the literature thoroughly and reached the conclusion that practically all cases have as their cause a septic embolism. Cutler and Schlueter¹² placed an infected embolus into the femoral or jugular veins of dogs and a pulmonary abscess resulted in every instance.

Conservative treatment by supportive measures and postural drainage is recommended for all acute cases. Heuer¹³ reported a group of 55 patients of whom 61.5 per cent recovered, 38.5 per cent died. Twenty-nine were treated by surgical drainage, and 65.5 per cent recovered, 34.5 per cent died. He used bronchoscopy as an adjunct in both the surgical and conservative treatment. Dr. M. G. Buckles of Louisville states that 55 per cent of acute abscesses will recover by conservative treatment, aided by the use of the bronchoscope, that at least 15 per cent of all cases will be favorably influenced by the skilful use of the bronchoscope. Twenty per cent

of the cases that he has seen will come to general surgery. This statement is based on six years experience of highly specialized work.

Graham¹⁴ finds that he is operating on a smaller proportion of these cases every year, and considers that surgery is indicated only when the abscess is superficial. Surgical treatment is chiefly indicated when the abscess is peripheral, and when bronchial drainage cannot be established. A two-stage drainage operation is probably the safest of all the surgical methods, and is therefore most suitable for routine use.

PULMONARY EMBOLISM

Embolism is the obstruction of a blood vessel, usually an artery, by particles of matter brought from elsewhere. Embolism of the pulmonary artery occurred five times in our 685 abdominal operations, a dramatic and tragic ending once in every 137 cases.

Peham and Amreich¹⁵ state that total embolism of arteries other than the pulmonary seldom occurs. While pulmonary embolism does occur following other incidents such as fractures, prostatectomy, herniorrhaphies, I have considered only those following abdominal operations. From a report of 10,650 necropsies at the Cook County Hospital¹⁶ and 567 from a general hospital in Philadelphia,¹⁷ the type of cases that developed embolism following operation was almost entirely limited to the abdomen and pelvis.

The incidence of embolism is increasing. This is of course both apparent and real. We are making a more thorough search and a larger number of poor surgical risks are coming to operation.

Can the occurrence of pulmonary embolism be predetermined? Are we able to distinguish the patient that is liable to this catastrophe? Since we are not able at present to attain this implied ideal condition, we must consider the circumstances and factors necessary for the production of embolism. Women are perhaps the victims more often than men, but by only a slight percentage. Overweight and cardiac insufficiency are definite factors. Sixty-two per cent of our patients were over 40 years of age. The youngest was 18, and the oldest 74. The type of anesthetic is not a determining factor. Most of the cases in the series occurred following inhalation anesthesia, principally cyclopropane and ether, but for two years, spinal was used in all pelvic operations with no appreciable change in the percentage. An anesthetic of long duration and a destructive operation almost invariably favor the occurrence of thrombosis and embolism. Robertson¹⁸ believes that the type of patient leads more readily to embolism rather than the kind of operation. He used the example of old men with prostatectomies, believing that the frequency of embolism in these is due to age and patient rather than to operation.

Three definite etiologic factors act together in the production of thrombosis, 1, injury to the vessel walls; 2, the slowing of the blood stream, and 3, change in the composition of the blood. Injury to the vessel wall takes place of course at the site and time of operation. The blood stream is slowed by the recumbent position, large doses of narcotics, and because of pain, binders and adhesive tape, respiratory excursions are shallow and the abdomen is quiet. The change in the composition of the blood is characterized by an increase in the number of blood platelets, marked acceleration of sedimentation rate, and a prolongation of bleeding and clotting time. Normal blood clots in from five to eight minutes. After an operation the time is shortened until the fourth day. If it is shortened beyond the fourth day, it is suggestive of embolism.

Embolism is usually a late complication, and often there are no recognizable signs of the impending crash, however in some instances there are certain indications of a brewing trouble. Out of 146 cases of fatal pulmonary embolism, Robertson found only 16 per cent with frank infection. A low grade fever persisting longer than the first postoperative week is often suggestive. If the patient is uneasy, restless, and apprehensive, with the chart showing up well, we may be on our guard.

You will note from the table that only two cases had a perceptible thrombophlebitis. Some thrombosis at or near the site of operation always precedes the ascent of the clot from the pelvic or abdominal vessels, and the deposit of this coiled obstruction in the pulmonary artery, but it is not easy to locate, and the cases with swelling, pain, and fever rarely have a serious embolism. It is well to remember that the pulmonary artery carries impure blood, and in that respect acts like a vein.

An embolus large enough to cause a complete block is rather tough and hard, and of surprising size. One of our recent cases measured 2 cm. in diameter.

"In only a small proportion of cases," says Robertson, "does thrombophlebitis result in pulmonary embolism; the adhesiveness of the clot is the determining factor. Once the large clot begins to crawl instead of becoming canalized, the fate of the patient is sealed. The resulting embolus has not occurred because the intern had the patient walk too soon or because the nurse permitted the patient to go to the bath room."

If it is a massive embolism and lodges in the main stem of the pulmonary artery, the result is swift and fatal. Pain, dyspnea, and cyanosis appear almost simultaneously and life is usually extinct in a few minutes. It has been said that one of this type never lives longer than fifteen minutes. Smaller emboli lodging in one or more

branches produce almost the identical symptoms, but in a lesser degree. An infarct then usually follows, and the corresponding area becomes acutely anemic and rapidly undergoes degenerative and necrotic changes. The life of the part has gone out, and MacCallum¹⁹ likens it to the streets of Pompeii as contrasted with those of a modern town.

Since it is impossible to detect with accuracy either by laboratory tests or clinical signs the development of a serious embolism, it is advisable as a routine to use our best preventive measures in elderly and obese patients, and in all cases in which we have cause to suspect thrombosis or embolism.

Summed up, the best preventive measures are hyperventilation, great care in the handling of tissues and in the ligation of blood vessels, avoidance of tight strapping, regular muscular movements in bed, the administration of ample fluids, and the maintenance of a proper mental attitude.

Thrombosis usually develops gradually, and in addition to exercises, many drugs are used to prevent slowing of the circulation. Strychnine and thyroid extract are used routinely in some hospitals. Oxygen is being more generally adopted. The object is to increase the rate of flow, and to prolong the clotting time of the blood. To accomplish this, heparin²⁰ is proving most useful. Heparin was developed by Howell in 1916. It is an anticoagulant obtained from the liver. It is non-toxic, and is effective both subcutaneously and intravenously. Murray²⁰ reports 300 cases in which it was given post-operatively, and none developed thrombosis or embolism, though many were the type in which it is prone to occur. It will maintain the clotting time at 20 minutes or even longer. It is valuable in blood transfusion and after embolectomies. It is expensive in price, but the effects of one dose will last for several days.

The surgical treatment consists in rapid exploration and removal of the clot from the pulmonary artery. This is the operation developed and recommended by Trendelenburg. It has met with very little success in this country. We all know only too well that with a massive crash the end is so sudden that there is not sufficient time to make a diagnosis, transport the patient to the operating room, and make the incision. Operation of course may be considered in any case after the diagnosis is established and there is any evidence of a favorable termination.

All postoperative pulmonary complications are serious, and demand our strictest attention. Many of them can be prevented. Embolism is so sudden, so dramatic, and so often fatal, that any surgeon may well dedicate himself to its elimination.

The American surgeon is the most humane, the most generous, and the most skilful in all the earth; but he is at the same time the busiest. Research and discovery must be left to our brothers in the laboratory. Pulmonary embolism is an evil visitor, who by his silent and dramatic approach steals the triumph and success of a thorough and painstaking operation. But we are not baffled, for progress marches on, and by perseverance and cooperation, medical science in due time will conquer this roaming fragment of destruction.

Lord Moynihan said,

"We have made the operation safe for the patient; now let us make the patient safe for the operation."

REFERENCES

1. King, Donald S.: Certain Aspects of Pulmonary Abscess from Analysis of 210 Cases, *Ann. Int. Med.* 8: 468-474 (Oct.) 1934.
2. Trueta, Raspall: La participation del simpatico en la genesis de la atelectasis pulmonar, *Rev. Med. de Barc.* 24: 412-418 (Nov.) 1935.
3. Lemon, W. E.; Vinson, P. P.; Moersch, H. J., and Wood, H. G.: A Clinic on Abscess of the Lung, *Med. Clin. N. America* 18: 429-450 (Sept.) 1934.
4. Henderson, Yandell: Address before New York Academy Medicine, *Bull. New York Acad. Med.* 11: 639-656 (Nov.) 1935.
5. Moore, A. E.: Treatment of Atelectasis, *Surgery* 5: 420-435 (Mar.) 1939.
6. Coryllos, P. N., and Birnbaum, G. L.: Lobar Pneumonia Considered as a Pneumococcic Lobar Atelectasis of the Lung, Bronchoscopic Investigation, *Arch. Surg.* 18: 190 (Jan.) 1929.
7. Bowen, A.: Pulmonary Embolism, *Am. J. Surg.* 36: 694-699 (June) 1937.
8. Balfour, D. C., and Gray, H. K.: Pulmonary Complications Following Operations on the Stomach and Duodenum, *Practitioner* 130: 625-637 (June) 1933.
9. Mayo, C. W.: Concentrated Oxygen as a Therapeutic Agent, *West Virginia M. J.* 35: 520-525 (Nov.) 1939.
10. Maxwell, James: Lung Abscess with Special Reference to Causation and Treatment, *Quart. J. M.* 3: 467-522 (July) 1934.
11. Cutler and Hunt: Cited by Maxwell (ref. 10).
12. Cutler and Schueler: Cited by Maxwell (ref. 10).
13. Heuer, G. J.: Treatment of Acute or Recent Pulmonary Abscess, *Surg., Gynec. & Obst.* 70: 472-478 (Mar.) 1940.
14. Graham, E. A.: Cited by Maxwell (ref. 10).
15. Peham, H. V., and Amreich, J.: Operative Gynecology. Philadelphia: J. B. Lippincott Co., 1934.
16. Kirshbaum, J. D., and Shively, F. L., Jr.: Pulmonary Embolism as the Primary Cause of Death in 10,650 Necropsies, *Illinois M. J.* 74: 145-148 (Aug.) 1938.
17. Crawford, B. L., and Mohler, H. K.: A Clinical and Pathological Study of Acute Pulmonary Embolism and Thrombosis, *Pennsylvania M. J.* 40: 1020-1026 (Sept.) 1937.
18. Robertson, Hugh: A Clinical Study of Pulmonary Embolism: An Analysis of 146 Fatal Cases, *Am. J. Surg.* 41: 3-21 (July) 1938.
19. MacCallum, cited in Boyd, Wm.: Surgical Pathology, ed. 2. Philadelphia: W. B. Saunders Company, 1929.
20. Murray, D. W. G.: Some Experimental and Clinical Aspects of the Use of Heparin, *Surg., Gynec. & Obst.* 70: 246-269 (Feb.) 1940.
21. Gosset, Bertrand, and Patel, cited in Collins, D. C.: Value of Papaverine Hydrochloride in Treatment of Postoperative Pulmonary Embolism, *Rocky Mountain M. J.* 35: 381-386 (May) 1938.

SIGNIFICANT FACTORS IN THE PROGNOSIS AND MORTALITY OF PERFORATED PEPTIC ULCER

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THREE is probably no other complication of gastroduodenal ulceration that requires more serious consideration than acute perforation. This is evinced by the apparent increase in its incidence and the general mortality of approximately 25 per cent. The bewildering pathogenesis and the widely different forms of management have made it a problem of perennial inquiry. This is clearly revealed by the annual increase in the voluminous publications that appear on this subject. Of even greater interest is the fact that during the past decade the general mortality in acute perforated gastroduodenal ulceration has not materially decreased. In a recent review of this subject it was found that in an analysis of over 20,000 cases collected from the literature of the past decade the general mortality has decreased only 2.4 per cent, i. e., from 26.1 per cent in 1930, to 23.7 per cent in 1939.¹ Thus, recent progress in the management of this complication has not been great and requires serious consideration.

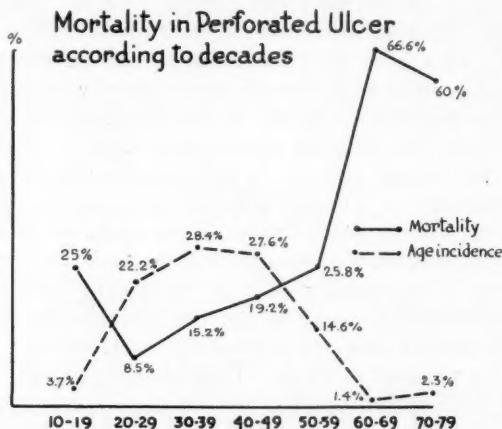
With this in mind and in an attempt to ascertain and direct attention to some of the significant factors in the prognosis and mortality of this condition we have reviewed and analyzed 211 cases of acute perforated ulcer admitted to the Charity Hospital, in New Orleans, during the ten year period, 1929 to 1938 inclusive. In a previous publication the cases were analyzed from the standpoint of incidence, clinical characteristics, and diagnostic factors.² In this presentation particular attention will be directed to the prognostic factors. It was found that sex, age, location of the lesion, time elapsing between the perforation and the institution of treatment, type of anesthetic and operative procedure employed, and the presence or absence and types of complications were among the most important factors in the prognosis.

The significance of the sex factor in the prognosis of acute perforated gastroduodenal ulceration is not generally realized. Whereas Heim³ and Gilmour and Saint⁴ record a slightly lower mortality incidence in females, the majority of observers have found that the mortality among females is greater. Bager⁵ analyzed 1,495 cases

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Read before the Postgraduate Surgical Assembly (the eleventh annual meeting) of The Southeastern Surgical Congress, Birmingham, March 11, 12 and 13, 1940.

admitted to 50 hospitals in Sweden and found that of 406 females, 176 (43.3 per cent) died and of 1,089 males, 314 (28.8 per cent) died. Yudine,⁶ in a large series of cases, reported a mortality of 37.5 per cent in females and 11.4 per cent in males. Similar differences were recorded by Lang⁷ and Susman.⁸ In our series respective incidences were 25 per cent and 18.8 per cent.



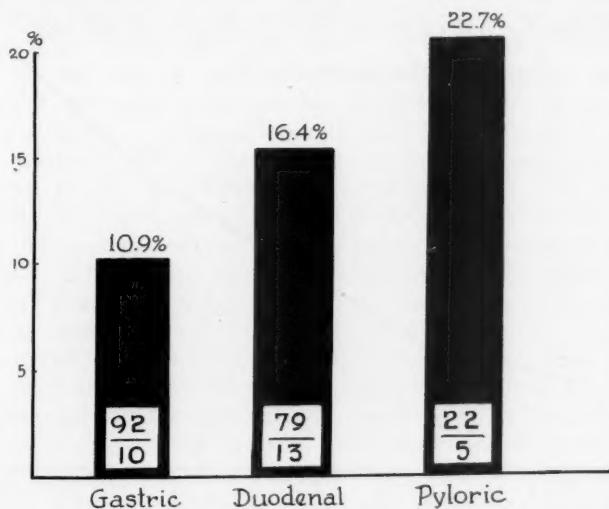
Graph 1: Graphic representation of mortality incidence in authors' cases according to decades.

Age is obviously an important factor and has been clearly demonstrated by the reported statistics. Richardson⁹ found that whereas the mortality was 11.8 per cent in patients under 40 years of age in patients over this age it increased to 53.3 per cent. Bager⁵ in a large series of cases reported a mortality rate of 15.9 per cent in the second decade and an increase in each succeeding decade to 62.8 per cent in the eighth. Similar increases have been observed by numerous others.^{5, 6, 8-19} In an analysis of almost 4,000 collected cases it was found that in patients under 30 years of age the mortality was 12.6 per cent, in patients between 30 and 49 years, it was 23 per cent, between 50 and 60, 47.2 per cent, and in patients over 70 years, 53.8 per cent.¹ In our series these figures were 10.9 per cent, 17.2 per cent, 29.4 per cent, and 60 per cent respectively (graph 1).

Whereas some authors²⁰⁻²⁴ have reported a higher mortality rate in duodenal ulcer perforations than in gastric, the majority of observers have found the opposite to be true. In his series of cases, Cable²⁵ reported a mortality incidence of 21.4 per cent in the gastric cases and 32 per cent in the duodenal. Similarly Fallis²⁴ found that the gastric ulcer cases had a mortality rate of 21.7 per cent and the

duodenal 30.3 per cent. Shelley²¹ reported incidences of 16.7 per cent and 18.8 per cent respectively. According to Sallick²² these corresponding incidences were 7.3 per cent and 11.5 per cent. Some-what similar results were found by the authors. Of 92 gastric ulcer perforations 10 patients (10.9 per cent) died and of 79 duodenal ulcer cases 13 patients (16.4 per cent) died (graph 2). On the

Mortality incidence according to location

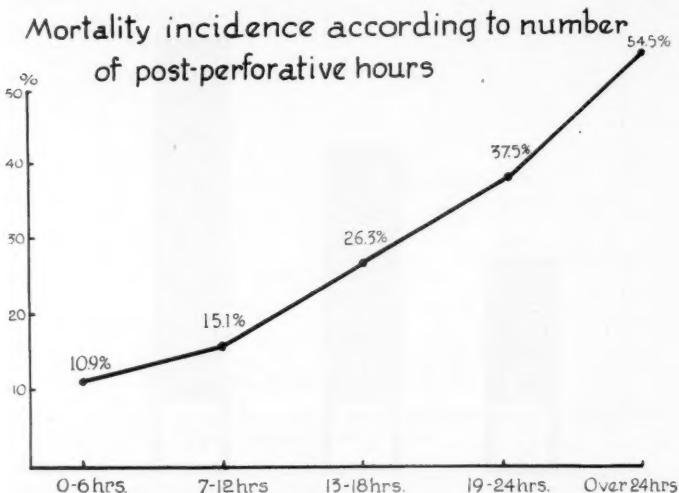


Graph 2: Graphic representation of mortality incidence in authors' cases according to location of lesion.

other hand, most authors report higher death rates in the gastric ulcer cases. In a collected series of 1,389 gastric ulcer perforations 462 (33.3 per cent) died, and of 3,152 duodenal ulcer perforations 665 (21.1 per cent) died.¹ Thus, it is probable that gastric ulcer perforations offer a worse prognosis. This is possibly explained on the basis that gastric ulcer perforations are more likely to occur in older individuals and spillage of intragastric contents is liable to be greater than in duodenal ulcer perforations.

It has been generally recognized that one of the most significant prognostic factors in acute perforated gastroduodenal ulceration is the time elapsing between the occurrence of the perforation and the institution of therapy. Numerous observers have directed attention to this fact. In his large series of cases Bager⁵ found that the mortality rate was 14.7 per cent in patients operated upon within the first six hours after the perforation and 26.5 per cent in those operated upon during the second six hours after perforation.

Whereas in those cases operated upon within the first twelve hours after perforation the mortality rate was 19.3 per cent, in those operated upon during the second twelve hours after perforation the mortality increased to 47.2 per cent. In those operated upon after twenty-four hours the mortality was 65.6 per cent. Shawan^{16, 25} found that the mortality rate in the second six hour period was double that of the first six hour period and that in the second twelve hour period it was more than three times the first. In a col-



Graph 3: Graphic representation of mortality incidence in authors' cases according to number of hours between perforation and institution of treatment.

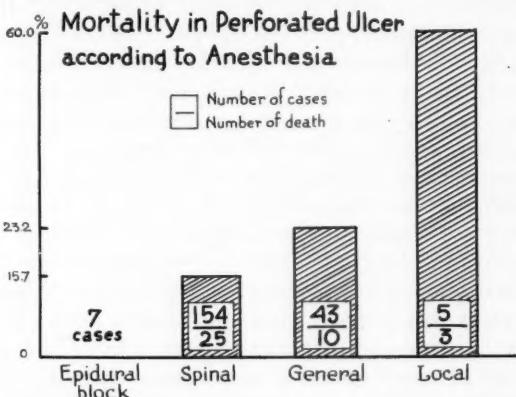
lected series of 462 cases Blackford and Baker²⁶ found that the mortality in the second twelve hour period was approximately double that of the first and after the twenty-fourth hour it was more than four times as great. Eliason and Ebeling²⁷ also analyzed a collected series and found that during the first six hour period it was 7.5 per cent, during the second 23.9 per cent, from twelve to twenty-four hours 35.4 per cent and from twenty-four to forty-eight hours 67.5 per cent. In a collected series of 7,683 cases it was found that the mortality rate in patients operated upon during the first six hours after perforation was 10.5 per cent, during the second 21.4 per cent, during the third 38.5 per cent, and during the fourth 62.4 per cent.¹ Whereas the mortality was 14.7 per cent in patients operated upon during the first twelve hours after perforation it was 42.6 per cent in those operated upon during the second twelve hours. In those operated upon after twenty-four hours it was 61.6 per cent. In our cases the mortality was 10.7 per cent during the first six

hours, 15.1 per cent during the second six hours, 26.3 per cent during the third, 37.5 per cent during the fourth, and 54.5 per cent in those patients operated upon after twenty-four hours (graph 3). Thus, it is apparent that the interval elapsing between the onset of perforation and the operation is significant and that other things being equal the longer this period the worse the prognosis.

However, it should be realized that the time factor is not always the most important nor is the prognosis always commensurate with the delay interval. As emphasized by Graves,^{12, 28} the general condition of the patient and the amount of peritoneal contamination that has occurred are qualifying factors. Thus, a perforation that occurred forty-eight hours previous to operation may become walled off or plugged by adhesions shortly after the perforation resulting in a relatively small amount of peritoneal contamination. This accounts for the fact that in some reported statistics the mortality incidence is lower in cases operated upon forty-eight hours or more after the occurrence of the perforation than in those operated upon within twenty-four to thirty-six hours after perforation. Thus, Graves²⁸ reported a collected series of cases in which the mortality incidence was 33 per cent in patients operated upon from forty-eight to seventy-two hours after perforation, whereas in those operated upon between twenty-four to forty-eight hours it was 50 per cent. A somewhat similar contrast was reported by Thompson²⁹ who found that in 54 cases operated upon from the thirteenth to the twenty-fourth hours after perforation the mortality was 46.2 per cent and in 73 cases operated upon 24 hours or more after perforation it was 34.2 per cent.

The type of anesthetic employed in operations for acute perforated gastroduodenal ulceration has a distinct influence upon the prognosis. Numerous observers have directed attention to the significance of this factor. Whereas some authors^{30, 31} have indicated their preference for general anesthesia, the majority of observers have found spinal analgesia to be the most desirable. Of interest in this regard are the comparative mortality statistics of the various types of anesthetics. For this purpose it is considered expedient to classify them into three groups: (1) general anesthesia, (2) spinal analgesia, and (3) local analgesia. Eliason and Ebeling²⁷ reported a mortality incidence of 52.1 per cent in the cases operated upon under general anesthesia, 30.8 per cent in those having spinal, and 44.4 per cent in those having local. These corresponding mortality incidences in the cases reported by Corff³² were 26.6 per cent, 18.8 per cent, and 71.4 per cent, and in those reported by Fallis,²⁴ 29.3 per cent, 7.3 per cent, and 100 per cent. Shewan²⁵ and Yudine,⁶ in relatively large series, found that the mortality rates in the cases

operated upon under general anesthesia were approximately twice and four times, respectively, of those under spinal analgesia. On the other hand Sallick²² reports a mortality incidence of 6 per cent in general anesthesia group and 17.4 per cent in the spinal. McCleery³³ also reported a lower mortality rate in the former type, although these were admittedly better risk cases. In a collected series of 1,776 cases the mortality incidence in those cases operated upon under general anesthesia was 29.9 per cent, in those under spinal 17 per cent, and in those under local 52.8 per cent.¹ In our series these corresponding mortality rates were 23.2 per cent, 15.5

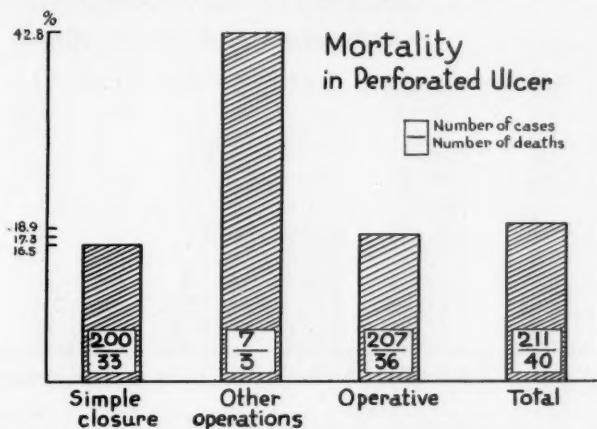


Graph 4: Graphic representation of mortality incidence in authors' cases according to type of anesthesia employed.

per cent, and 60 per cent (graph 4). It would appear, therefore, that spinal analgesia is the one of choice. The high mortality rate in those cases operated upon under local is probably due to the fact that these cases were originally poor risks. We have previously expressed the opinion that spinal analgesia is preferable because complete relaxation is obtained permitting better exposure and less manipulative trauma. Such relaxation is difficult to effect in these cases with general anesthesia and the toxicity of a general anesthetic is an additional burden upon the liver.

There is still considerable controversy regarding the choice of the various operative procedures which have been advocated in the treatment of acute perforated gastroduodenal ulceration. Whereas the majority of American and English surgeons are warm advocates of the simpler and more conservative procedures, the continental European surgeons favor the more radical procedure of partial gastrectomy. It is considered inopportune to attempt here a detailed discussion of the advantages and disadvantages of these various

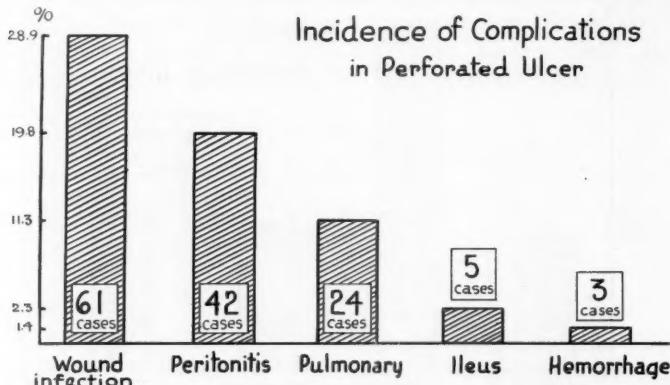
procedures. This has been analyzed in another publication.¹ Of interest here, however, is the influence of the operative procedure upon the prognosis and mortality. That the type of operation employed is apparently significant is demonstrated by the reported statistics of various authors. Numerous reports have appeared in which the mortality rate following simple closure is less than 15



Graph 5: Graphic representation of mortality incidence in authors' cases according to type of operative procedure.

per cent.^{4, 21, 22, 34-43} On the other hand, others^{6, 44-52} have reported even lower incidences following the more radical procedure of partial gastrectomy. Thus Bager,⁵ who reported an unusually large series, found that the mortality rate following simple closure was 32.8 per cent and that which followed gastrectomy 25 per cent, whereas the procedure of closure plus gastroenterostomy gave a mortality rate of 23.4 per cent. Baron⁵³ reported a mortality of 42.1 per cent following simple closure as compared with 18.8 per cent following partial gastrectomy. An even greater contrast was reported by Gerhardt¹⁴ who found that these respective mortality rates were 64.7 per cent and 17.9 per cent. He also found that simple closure plus gastroenterostomy gave the lowest mortality, 15.4 per cent. Graves,^{12, 28} in 775 collected cases, found that gastric resection was followed by a lower mortality than the more conservative procedure. Yudine,⁶ in a recent analysis of 1,438 cases from his clinic, found that the mortality rate following simple closure was 42.7 per cent as contrasted with 8.9 per cent which followed resection. In a collected series of over 15,000 cases, the mortality incidence following simple closure was found to be 25.9 per cent, that following simple closure plus gastroenterostomy 20.4 per cent, and that following partial gastric resection 13.5 per cent.

From these statistics it would appear that simple closure as an operative procedure offers the worse prognosis. However, it should be realized that many of the cases, and in the continental European clinics particularly most of the cases in which simple closure was performed were admittedly poor risks. Moreover, the more radical procedure of partial gastrectomy is an operation which is per-

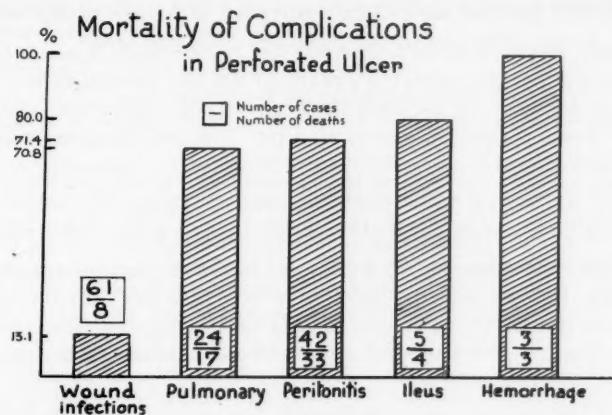


Graph 6: Graphic representation of incidence of complications in authors' cases.

formed relatively frequently and therefore skillfully in these clinics. That these are factors of importance in evaluating these statistics is clearly demonstrated by the fact that in the collected series the mortality incidence of the continental European surgeons following gastrectomy was 13.2 per cent as compared with that of 28.9 per cent reported by the American and English surgeons.¹ On the other hand, the latter group of surgeons had an average mortality rate of 22.1 per cent following simple closure whereas the former had an average mortality incidence of 31.9 per cent following this type of operative procedure.

Obviously statistical analyses of comparative mortality rates for the various types of operative procedures cannot determine the superiority of one over the other. It is our opinion that the operation of choice of these cases is the one which effects most expeditiously adequate repair of the defect. For this reason simple closure is considered the most desirable. Reinforcement with omental graft may also be employed if conveniently performed. On the basis of clinical and experimental investigations, gastroenterostomy is considered undesirable except in those patients in whom the gastric acidity is below the normal level.⁵⁴⁻⁵⁷ In our series of cases, simple closure was followed by a considerably lower mortality rate than the more radical procedures (graph 5).

The presence of complications obviously plays a significant role in the prognosis. This is clearly demonstrated by the fact that in a large series of collected cases, the two most frequent causes of death, totaling over three fourths of all causes, were peritonitis and pulmonary affections which formed the highest incidences of com-



Graph 7: Graphic representation of mortality incidence of complications in authors' cases.

plications. Peritonitis comprised almost 32 per cent of the complications and 57 per cent of the causes of death. This clearly indicates its seriousness and its significance in the prognosis. The next most frequent cause of death, pulmonary affections, comprised 20.8 per cent of the group and 32.8 per cent of the complications. Wound infection and evisceration formed 25.4 per cent of the complications, but only slightly less than 1 per cent of the causes of death. In our series of 211 cases, 28.9 per cent were complicated by wound infection (8 of the 61 had evisceration), 19.8 per cent by peritonitis, 11.3 per cent by pulmonary affection, 2.3 per cent by ileus, and 1.4 per cent by hemorrhage (graph 6). The relative importance of these complications is shown by their incidence of deaths. Thus 13.1 per cent of those having wound infections died, 70.8 per cent of those having pulmonary affections, 71.4 per cent of those having peritonitis, 80 per cent of those having ileus, and 100 per cent of those having hemorrhage (graph 7).

SUMMARY

1. An analysis of some of the significant factors in the prognosis and mortality of acute perforated gastroduodenal ulceration and a review of 211 cases admitted to the Charity Hospital of New Orleans during the ten year period 1929 to 1938 inclusive are pre-

sented. It was found that sex, age, location of the lesion, time elapsing between the perforation and the institution of treatment, type of anesthetic and operative procedure employed, and the presence or absence and types of complications were among the most important factors in the prognosis.

2. In the present series, the mortality incidence in the female sex was 25 per cent and in the male sex 18.8 per cent.

3. In the patients under 30 years of age the mortality incidence was 10.9 per cent, in patients between 30 and 49 years, 17.2 per cent, between 50 and 69 years, 29.4 per cent, and in those over 70 years, 60 per cent.

4. Of 92 gastric ulcer perforations, 10 (10.9 per cent) died, and of 79 duodenal ulcer perforations, 13 (16.4 per cent) died.

5. The mortality was 10.7 per cent in those cases operated upon during the first six post-perforative hours, 15.1 per cent during the second six hours, 26.3 per cent during the third, 37.5 per cent during the fourth, and 54.5 per cent in those patients operated upon after twenty-four hours.

6. The mortality rate in those cases operated upon under general anesthesia was 23.2 per cent, in those under spinal, 15.5 per cent, and in those under local, 60 per cent.

7. The mortality rate following simple closure was 16.5 per cent, whereas in those in which more radical procedures were employed it was 42.8 per cent. The authors consider simple closure the procedure of choice. The general mortality in the 211 cases was 18.9 per cent, and the operative mortality was 17.3 per cent.

8. The most frequent and most serious complications were peritonitis and pulmonary affections. Although wound infections occurred as a complication more frequently than these, they were relatively less serious.

REFERENCES

1. DeBakey, Michael: Acute Perforated Gastro-duodenal Ulceration. A Statistical Analysis and a Review of the Literature (in press).
2. Odom, Charles, and DeBakey, Michael: Acute Perforated Gastric and Duodenal Ulcer, New Orleans M. & S. J. 92: 359, 1940.
3. Heim, Wilhelm: Review of 283 Cases of Gastric and Duodenal Perforations Operated on, Deutsch med. Wehnschr. 63: 1321, 1937.
4. Gilmour, J., and Saint, J. H.: Acute Perforated Peptic Ulcer: A Review of Sixty-four Cases, Brit. J. Surg. 20: 78, 1932-1933.
5. Bager, Bertel: Beitrag zur Kenntnis über Vorkommen, Klinik und Behandlung von perforierten Magen-und Duodenalgeschwüren nebst einer Untersuchung über die Spätregebnisse nach Verschiedenen Operationsmethoden, Acta Chir. Scand., Supp. II, 64: 5, 1929.
6. Yudine, Serge: Etude sur les ulcères gastriques et duodénaux perforés, J. Internat. de Chir. 4: 219, 1939.

7. Lang, H. J.: Über den Durchbruch von Magen-und Zwölffingerdarmgeschwüren in die freie Bauchhöhle. Erfahrungen und Beobachtungen an 152 Fällen, Beitr. z. klin. Chir. 162: 143, 1935.
8. Susman, M. P.: Perforation of the Stomach and Duodenum due to Simple Ulcer and Carcinoma, M. J. Australia 1: 456, 1939.
9. Richardson, E. P.: Acute and Subacute Perforations of the Stomach and Duodenum at the Massachusetts General Hospital, Boston M. & S. J. 176: 158, 1917.
10. Semb, Carl: Acute Free Perforation of Gastric and Duodenal Ulcers, Acta Chir. Scandinav. 66: 315, 1930.
11. Williams, H., and Walsh, C. H.: Treatment of Perforated Peptic Ulcer, Lancet 2: 189, 1930.
12. Graves, A.: Perforated Peptic Ulcer in German Clinics, Ann. Surg. 98: 197, 1933.
13. Calvet, J.: Sur 43 cas d'ulcères perforés de l'estomac et du duodenum, Presse méd. 43: 22, 1935.
14. Gerhardt, Franz: Experience with Treatment of Perforating Gastric and Duodenal Ulcer at the First Surgical Clinic of the University of Vienna between 1919 and 1933, Wien. klin. Wochenschr. 49: 1389, 1936.
15. Raven, R. W.: The Results Obtained in the Treatment of Perforated Gastric and Duodenal Ulcers, St. Barth. Hosp. Reports 69: 229, 1936.
16. Shawan, H. K.: Further Observations on Acute Perforated Acid Ulcer of the Stomach and Duodenum, J. Michigan M. S. 36: 629, 1937.
17. Rawles, B. W.: Management of Acute Perforated Peptic Ulcer, Virginia M. Monthly 65: 484, 1938.
18. Davison, M.; Aries, L., and Pilot, I.: A Bacteriological Study of the Peritoneal Fluid in Perforated Peptic Ulcer, Surg., Gynec. & Obst. 68: 1017, 1939.
19. Ross, Albert, and Letourneau, Charles: Perforated Peptic Ulcers (Analysis of a Series of 228 Consecutive Cases), Canadian M. A. J. 41: 473, 1939.
20. McGlannan, A., and Bongardt, H. F.: The Effect of Acute Perforation on the Course of Peptic Ulcer, Surg., Gynec. & Obst. 44: 390, 1927.
21. Shelley, H.: Perforated Peptic Ulcers (A Statistical and Roentgenological Study of 82 Cases), Am. J. Surg. 15: 277, 1932.
22. Sallick, M. A.: Late Results in Acute Perforated Peptic Ulcer Treated by Simple Closure, Ann. Surg. 104: 853, 1936.
23. Cable, J. V.: Late Results of Surgical Treatment in Perforated Peptic Ulcer, Brit. M. J. 2: 403, 1938.
24. Fallis, L. S.: Perforated Peptic Ulcer. An Analysis of 100 Cases, Am. J. Surg. 41: 427, 1938.
25. Shawan, H. K.: Acute Perforated Ulcer, Am. J. Surg. 40: 70, 1938.
26. Blackford, J. M., and Baker, J. W.: Acute Perforated Peptic Ulcer: A Report of 21 Cases with Review of 933 Cases Reported by 13 Authors During the last 10 Years, Am. J. Surg. 12: 18, 1931.
27. Eliason, E. L., and Ebeling, W. W.: Catastrophes of Peptic Ulcer, Am. J. Surg. 24: 63, 1934.
28. Graves, Amos M.: Perforated Peptic Ulcer, Internat. Surg. Digest 16: 259, 1933.
29. Thompson, H. L.: Acute Perforation of Peptic Ulcer. Immediate and Late Results in 500 Cases, J. A. M. A. 113: 2015, 1939.
30. Bizard, G., and Malatray, H.: L'avenir des perforations d'ulcères gastroduodéaux; étude d'une statistique opératoire, L'Echo méd. de nord 3: 148, 1935.
31. Troutt, H. H.: Acute Perforations of "Peptic" Ulcers, Am. J. Surg. 46: 621, 1939.
32. Corff, Meyer: Acute Perforated Peptic Ulcer. A Review of 63 Cases, Am. J. Surg. 31: 77, 1936.
33. McCleery, Robert: A Statistical Analysis of 100 Consecutive Cases of Ruptured Peptic Ulcer, Bull. Jackson Mem. Hosp., Miami 2: 45, 1940.
34. Colp, R.: Perforated Gastro-duodenal Ulcers, New York State J. Med. 29: 13, 1929.
35. Patterson, J. C.: Acute Perforation of Gastric and Duodenal Ulcers, J. M. A. Georgia 18: 502, 1929.
36. Bryce, A. G.: Acute Perforation of the Stomach and Duodenum: A Critical Review of the Results of Operation, Brit. M. J. 1: 774, 1930.

37. Black, J. M.: Perforated Gastric and Duodenal Ulcer: A Survey of 50 Consecutive Cases, *Brit. M. J.* 2: 290, 1933.
38. Pich, H.: Zur chirurgischen Beurteilung des *ulcus ventriculi perforatum* und seiner Behandlungsmethoden, *Beit. z. klin. Chir.* 159: 346, 1934.
39. Tilton, B. T.: Low Mortality of Early Operation for Perforated Gastric and Duodenal Ulcer, *Am. J. Surg.* 32: 238, 1936.
40. Graham, R. R.: The Treatment of Perforated Duodenal Ulcers, *Surg., Gynec. & Obst.* 64: 235, 1937.
41. Woodall, C. W.: Acute Perforations of Stomach and Duodenum; Study of 36 Cases, *Am. J. Surg.* 35: 524, 1937.
42. Nicolas, L.: Surgery of the Perforated Gastro-duodenal Ulcer, *Archiv. f. klin. Chir.* 191: 602, 1938.
43. Hagyard, C. E.: Acute Perforation of Peptic Ulcers, *Northwest Med.* 38: 119, 1939.
44. Kunz, H.: Über die Resektion beim freien Durchbruch des Magen-Zwölffingerdarmgeschwüres, *Arch. f. klin. Chir.* 160: 390, 1930.
45. Richard, M.: Zur Frage der primären Resektion bei Magen-Duodenalperforation, *Zentralbl. f. Chir.* 58: 149, 1931.
46. Ciancarelli, S.: La resezione gastrica come intervento d'urgenza nelle perforazioni gastro-duodenali, *Arch. ital. di chir.* 39: 677, 1935.
47. Koennecke, W.: Die Resektion des perforierten Magen-und Zwölffingerdarmgeschwürs, *Beit. z. klin. Chir.* 162: 315, 1935.
48. Peters, K. O.: Bericht über primäre Resektionen wegen perforierter Magen-und Zwölffingerdarmgeschwüre, *Chirurg* 7: 78, 1935.
49. Steiger: Ein Beitrag zur Frage der Operationswahl beim perforierten. Magen-Zwölffingerdarmgeschwür, *Wien. med. Wochenschr.* 85: 828, 1935.
50. Carayannopoulos, G., and Christeas, N.: Sur 18 cas de perforation d'ulcère gastrique ou duodenal, 13 gastrectomies, *Mém. de l'Acad. de Chir.* 62: 1061, 1936.
51. Stocker, H. E.: Einige Bemerkungen zur Diagnose und Therapie des *Ulcus perforatum*, *Zentralbl. f. Chir.* 64: 610, 1937.
52. Kirrmann, E.: Experience with Perforated Gastro-duodenal Ulcers and Peptic Jejunal Ulcers in the State of Perforation, *Chirurg.* 10: 468, 1938.
53. Baron, A. G.: Resección en las perforaciones agudas duodeno-gástricas?, *Rev. españ. de Enferm. d. ap. digest. y de la nutrición* 1: 883, 1935.
54. Ochsner, Alton; Gage, Mims, and Hosoi, Kiyoshi: Treatment of Peptic Ulcer Based on Physiologic Principles, *Surg., Gynec. & Obst.* 62: 257, 1936.
55. Gage, Mims: Surgical Treatment of Peptic Ulceration, *South. Surgeon* 6: 392, 1937.
56. DeBakey, Michael: Relative Protective Value of Alkaline Duodenal Juices Against Gastro-jejunal Ulceration, *Proc. Soc. Exp. Biol. & Med.* 32: 1494, 1935.
57. DeBakey, Michael: Peptic Ulceration: The Relative Protective Value of the Alkaline Duodenal Juices, *Arch. Surg.* 34: 230, 1937.

MELANOMAS A Clinical Discussion

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MELANOMAS remain probably the most dramatic in their growth of all the neoplasms. A standard nomenclature, a classification with regard to other tumors and uniform methods of treatment have not been satisfactorily established. It is for these reasons we feel this to be an appropriate time to call attention to the present concepts of origin, pathology and treatment of this tumor.

Variations in the histopathology of melanomas and a profusion of theories as to their origin have resulted in great confusion in the nomenclature. Malignant nevus, melanocarcinoma, melanosarcoma, melanoeithelioma, nevocarcinoma, melanocytoblastoma, malignant melanoma and melanoma, are names which have been variously proposed.

Greenblatt, Pund and Bernard¹ suggest that many years ago in the dark abysmal depths of time, when the ancestors of man were slowly awaking from the reptile-like state to the lowly primitive mammal, certain reptilian characteristics were preserved. Among these are the pigmented tactile spots, which in the course of evolution were replaced by tactile mammalian hair follicles. It is not difficult for us to conjure in our minds an image of an evolutionary predecessor in the mammalian scale, perhaps grotesque and bizarre of shape, slow of movement, the body covered with raised, rounded, pigmented, hairy tactile tubercles, by which contact with the external environment was effected. The commonest human neoplasm, namely the benign, pigmented mole, or nevus, is but a trifling case of reversion to type, dating back to the phylogenetic period, when the ancestors of man, that is the amphibia and reptiles were peppered with pigmented spots and tubercles.

It is pointed out by Huxley that sense organs are but successive modifications of simple dermal tactile structures. The ball of the eye is nothing more than an extremely metamorphosed hair sac. It is little wonder, then, that every human has sometime in his life at least one nevus. In fact, study of apparently normal humans has revealed an average of twenty nevi for each subject examined.

Becker states that normal melanin pigment is found in human beings in the skin and adjacent mucous membranes, in the eye and in the pia mater about the region of the medulla. These are the

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Presented before the Texas Surgical Society meeting, Dallas, April 1, 1940.

only remnants of the more extensive pigmentation of the lower forms in the cutaneous, ocular and perineural regions. It is therefore only in these regions that melanotic neoplasms should occur, and the occurrence elsewhere must depend on misplaced melanoblasts, these being the cells which control normal pigmentary processes, and may be identified about the fifth month of fetal life by the "dopa" reaction. Malignant cells of melanomas show this reaction.

Arising in association with these cells, whether derived directly from them or not, are the nevi, the simplest of all the pigmented tumors. The great variation in their morphology, flat or elevated; gray, brown or black; hairy or hairless; rough or smooth; round or irregular, are well known to all of us.

Such tumors may remain harmless for years or for life, or they may change in the rate and limitation of their growth, because of trauma or for no apparent reason whatever, into one of the most malignant of all tumors, the melanoma.

However, not all melanomas arise from previously existing moles. Becker's experience was similar to that of Meischer, whom Becker quotes as finding 75 per cent of his cases giving no history of pre-existing nevus.

Metastasis occurs through the lymphatic and regional lymph nodes. Cutaneous metastasis are common. Metastasis by the blood stream is usually delayed, but is the usual manner in melanoma of the eye.

Pigment removed from the tumor by phagocytes is liberated by the kidneys and may be identified in the urine by addition of ferric chloride, which is followed by darkening of the urine.

The best treatment for melanoma is the removal of the pigmented moles by surgical excision while still quiescent, and before any evidence of malignancy has occurred. Certain obstacles must be overcome to carry out such a plan. Many individuals have so many pigmented moles on their bodies that complete removal of all is impractical and is not to be attempted. Suspicious moles that are black, slick and shiny, or those that are growing, or are irritated from any cause, should be removed. The patient should be instructed to report for treatment if any further moles of this type appear, or if any present begin a change in appearance.

Articles written in the lay press to inform people about the nature of these black moles are often misinterpreted and may result in harm rather than good. They read that any irritation, such as burning, cauterizing or incomplete removal is dangerous. Therefore, they decide to leave them strictly alone unless there is gross

evidence of trouble, believing surgical interference is fraught with great danger.

The black moles, either malignant or non-malignant, should not be fulgurated or cauterized, but preferably excised with electro-surgical knife, going wide and deep. If the tumor is grossly malignant or is shown to be so by biopsy, then the excision should be very wide and carried down to muscle. If the glands are not involved at the time of surgery, they should be left to filter out any metastasis, which might occur and in the meantime irradiation of the lymphatic drainage area is indicated. If glandular involvement is evident at the time of removal of the primary growth, the glands may be removed at this time. X-ray treatment is of questionable value but we have used it in all the cases, either as a preoperative or post-operative measure to block the lymphatics and thus prevent a generalized metastasis.

Melanoma is one of the most radioresistant of all tumors. Adair found only 2.5 per cent of his cases showed response to irradiation.

Surgical removal offers about 15 per cent of five year cures in the hands of the best surgeons in the country.

Tumors located in certain areas of the body offer better opportunity for cure than others. Sub-ungual and intra-ocular tumors probably have the best chance of cure. Amputations are not indicated, except in the case of fingers and toes, when a wide removal cannot otherwise be done.

Prognosis is difficult because of the difficulty of pathologic interpretation in borderline cases. Tumors that are miscoscopically non-malignant, or questionably so, may give rise to secondary growths that are highly malignant. On the other hand, those who remove a large number of pigmented tumors as a routine, find many that have the microscopic appearance of highly malignant growths, yet at the time are apparently inactive, and only lack some stimulating factor to start them on a wild rampage of destruction.

CASE REPORTS

CASE 1. *Malignancy following removal of an apparently non-malignant mole:*

A 43 year old physician came to the hospital in 1931, complaining of a mole on the lateral aspect of the middle third of the left leg. This was excised and the pathologic report showed a benign nevus. Two years later, in 1933, a mole had appeared just posterior to the scar of previous excision. This was excised and again reported as a benign nevus. In 1936 a third mole appeared, again outside the previous scar, but in the same region. A short distance above this mole, in the skin, there was a small, round, hard mass. The mass and mole were both excised. Pathologic diagnosis was, for the mole questionable, malignant melanoma; for the small tumor mass, malignant melanoma. Fol-

lowing removal the patient received massive doses of x-ray over the leg and groin. During the next six months he visited many of the best clinics in the country but no further treatment was advised. In 1937, six months after the diagnosis of melanoma was made, a nodule was removed from the region of the saphenous vein on the left. This again showed melanoma. The course from this time on was down hill and the patient died from general metastases six months later.

CASE 2. Rough, hairy, pigmented moles do, though rarely, become malignant:

A woman, aged 27, was first seen in September, 1939, stating that she had had a large mole on the chest as long as she could remember, and that she had recently noticed small nodules under the skin of the arms. The patient stated that she could notice no change whatever in the size of the original tumor, which was situated over the lower portion of the sternum, and was a brown, rough, hairy pedunculated mass about 1 cm. in diameter. Lately the mole had been irritated and was slightly ulcerated. X-ray examination revealed metastases in the lungs. Deep x-ray therapy was given but the patient died in December, 1939. One of the nodules removed from the arm during life showed large, heavily pigmented, spindle cells, with elliptical hyperchromatic nuclei, with many mitotic figures. At autopsy, the original tumor and all metastatic masses from the chest and abdomen were found to contain this same type cell.

CASE 3. Danger of incomplete removal by chemical cauterization or fulguration:

A 29 year old white woman was admitted in 1927, giving a history of having had a mole removed with acid from the right side of the chin about four months previously. This had soon recurred and had increased in size. The mole was about 7 mm. in diameter and was elevated about 5 mm. above the surrounding skin. The mole was excised and found to be a melanoma. The patient was given deep x-ray therapy. However, she failed to return for observation until November, 1937, when she complained of fatigue, insomnia and aching pains in both arms, and through the chest. Fluoroscopic and x-ray examination of the chest revealed no abnormality. She had also complained of glandular enlargement of the neck for approximately two months. Firm, enlarged, cervical lymph glands were present on both sides, especially on the right. Pathologic examination following removal of two, right, cervical, lymph nodes, showed metastatic melanoma. The patient subsequently died at home.

CASE 4. Tumors in certain areas of the body are more amenable to treatment than in others:

A 67 year old man was seen in June, 1936, having had an injected area in the sclera of the right eye, near the inner canthus. Three weeks prior to entrance to the hospital, a black lump appeared in this injected area. There had been a purulent discharge. Vision in the left eye was normal. Vision in the right eye was limited to counting fingers at three feet. The right fundus was seen with a +8 diopter lens. Dark masses were seen involving the upper, inner quadrant. Enucleation of the right eye and excision of the lower two thirds of the lid was performed. Pathologic examination revealed a malignant melanoma of the conjunctiva of the lower lid. There was no evidence of malignancy in the eye ball itself. The patient is quite well at the present time.

CASE 5. Misunderstanding of malignancy by the laity:

A young girl was brought to the clinic by her father, who had read a great deal of lay literature about the danger of cancer. The father was superintendent of a public school district. The patient had an elevated brown mole on the back. The father would not, at first, permit simple excision, thinking this to be dangerous, but insisted upon "blood test" to rule out cancer. He was finally prevailed upon to permit excision, followed by immediate examination of frozen sections. The pathologic diagnosis was of benign nevus, and in this case there is certainly no danger whatever of melanoma.

SUMMARY

1. The term "melanoma" is employed to include all malignant tumors of this group, regardless of theory of origin or histopathologic picture.
2. External, pigmented, tactile organs present in amphibia and reptiles are presented as possible phylogenetic ancestors of the cells composing melanomas.
3. Nevi of almost any type may be predecessors of melanomas. Early and accurate diagnosis of borderline cases is extremely desirable and extremely difficult.
4. Carefully planned and skillfully executed surgery, preferably before malignant changes have occurred, is the only treatment offering hope of cure.
5. These tumor cells are radio-resistant but in all cases, whether gross or questionably malignant, extensive irradiation should be done.
6. The laity and certain physicians should be educated to differentiate between surgical removal, which is safe, and incomplete removal by cautery or other means, which is dangerous.

REFERENCES

1. Greenblatt, R. B.; Pund, E. R., and Bernard, G. T.: Problem of Borderline Case, The Benign Nevus: The Malignant Melanoma; *South. M. J.* 29: 122-129 (Feb.) 1936.
2. Becker, S. W.: Treatment of Melanoma: *Internat. Clinics* 3: 46 (Sept.) 1936.
3. Adair, F. E.: Treatment of Melanoma: Report of Four Hundred Cases: *Surg., Gynec. & Obst.* 62: 406-409 (Feb.) (No. 2A) 1936.

INTERPRETATION OF THE DIARRHEAS ENCOUNTERED IN PROCTOLOGIC PRACTICE

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SOME of the very puzzling problems that have confronted me at times in my practice may not prove as interesting in their presentation to you as I have found them, but their interpretation oftentimes required such an extensive knowledge of medicine that the opinions of the general practitioner, the pediatrician, the gastroenterologist, the pathologist, the roentgenologist, and the proctologist were combined to solve them.

Permit me to state that as a proctologist, my practice embraces all colonic disease of which rectal abnormalities form a part, and only so, because I have had a good fundamental training in general surgery. This, I am proud to say, is one of the primary requisites for fellowship in the American Proctologic Society. I am greatly annoyed by those who tell me their practice is limited to diseases of the anus, rectum, and sigmoid colon and that their only entry into the abdominal cavity is when they operate for rectal cancer. Such occasional invasions can hardly prove very satisfactory to the operator and less so for the patient.

No other specialty requires more patience in eliciting important data from the afflicted, demands greater skill in making careful examinations or insists on better judgment in the treatment of these patients from a medical, surgical or a psychologic standpoint.

In diseases of the large bowel (comprising the anus, rectum and colon), pathologic invasion, chemical or mechanical irritation by the intestinal contents, together with nervous influences, form the principal causes for most existent trouble. It is mandatory, therefore, that in all cases a careful history and physical interpretation be made, which must include a proctosigmoidoscopic examination by one particularly trained in this respect. Of the various symptoms encountered in colonic disease, I am convinced that diarrhea is even more provoking and disconcerting than pruritus. Erroneously considered a disease in itself by some, years ago, diarrhea has so frequently played a prominent part in the symptom-complex of intestinal disease amongst both young and old that we have often heard these patients say they had "the diarrheas."

Our knowledge of the various entities which produce these diseased conditions—characterized by frequent evacuations of the

bowels, and generally known as diarrhea, has been constantly improved by combating various epidemics in foreign countries and throughout the North, South, East, and West of our own United States, with the recognition of certain etiologic factors which were formerly believed to be endemic in nature but must now be given serious consideration and sought for wherever human beings are found. This widespread condition is the sequence of pestilence and disease in wars, the ease afforded the modern traveler to distant points, coupled with an increased transient population in our own country during the past ten years. Proper sanitary, diagnostic and precautionary measures on the part of both individual and state were frequently lacking. It is urgent that every patient with a diarrhea or a history of diarrhea be placed on "typhoid precautions" until proven free of infection in order successfully to fight disease and better our health rate.

Constant reminders to our colleagues and continued admonitions to the laity that they "view any marked deviation from the usual intestinal habit" as a danger signal, has helped to make earlier diagnoses—by bringing these patients to us when the symptomatology is in comparatively primary stages.

I shall not burden you with the technic of proctoscopy or sigmoidoscopy, or consume much valuable time by detailed analyses of interpretative findings from such examinations, but I do believe that each one of you should possess and know how to insert a rectal speculum. It would be an insult to your intelligence and an utter lack of confidence by me in the personnel of this Congress if I believed that those patients consulting you, because they had a diarrhea, were hastily ushered out of your offices, with a smile and a handful of suppositories plus a bottle of bismuth and paregoric, without your ever having inspected the abdomen and anus, made a digital examination with the gloved finger, or looked into the anorectal channel with your proctoscope. Should time, modesty or your own lack of interest forbid such procedure, at least within a reasonable period,—insist that such routine examination be done by others—competently trained, that early diagnosis may be made and that your own fair name and practice may be protected. The availability of free clinics for the indigent permits of early diagnosis and treatment today more so than ever in the history of medicine; this, however, is contrary to what some of our legislators would have the laity believe.

In the interpretation of the various diarrheas encountered in proctologic practice, sigmoidoscopic examination is of primary importance. The taking of specimens for biopsy, scrapings from ulcerations and the thorough examinations of the feces demand the

close cooperation of a competent pathologist; in addition to the above, thorough blood and urine investigations, careful bacteriologic study and occasional animal inoculation are demanded. Furthermore, fluoroscopic findings and the double contrast enemas, when properly interpreted by the experienced roentgenologist, have proven valuable adjuncts in analyzing the causes and determining the diagnoses of these diarrheas.

Feces collected in clean glass containers, free from urine, should be kept warm and be examined for best results within 30 to 45 minutes; if sent from a distance, a fresh stool is forwarded after careful packing, to the nearest laboratory. Ofttimes solid and loose stools are preferably collected in separate containers, particularly when a search for protozoa is being made (*Entamoeba histolytica* and *Balantidium coli* especially). Microscopic observations of the quantity, shape, color, consistency, and odor may be valuable indications of certain alimentary disturbances. Pin or round worms or segments of tapeworms are occasionally present and searching for them by stool washings through a sieve may be necessary. I wish to mention the testing for occult blood and bilirubin merely to refresh your memory. Experienced microscopic knowledge for the finding of ova or amebas in the stools and from swabs or scrapings is most important and such procedures should be repeated four or five times before assuming that these protozoal cellular elements are not present in the intestinal tract; at least, they cannot be found at the present time, and that later study may be necessary. Certain undigested food particles, cells and crystals, constitute normal stool findings, but bacterial examination is more frequently confined to the isolation of some particular bacillus as *B. typhosus*, *Para A* and *B. B. dysenteriae* (particularly the Flexner, Sonne, and Shiga strains), and the tubercle bacillus. The sporozoia (*Coccidium hominis*) and the intestinal flagellates (*Trichomonas hominis* and the *Giardia, lamblia intestinalis*) are frequently found but their pathogenicity is still a much disputed question and by many parasitologists are regarded as non-pathogenic.

When we speak of a diarrhea, we refer to frequent evacuations of the bowels, ranging in number from 4 to 20 or more, and associated with a marked looseness of the contents which may be very watery or semi-liquid and may contain much mucus, pus, blood, or other cellular materials. Evacuations frequently vary in individuals and only when there is a (marked) deviation from the usual habit can we consider the condition pathologic.

In reviewing the various cases that have been seen by me in private practice and numerous free clinics, I was surprised at the large number of patients in which diarrhea has been a prominent and

ofttimes long standing symptom. Certain unusual disease conditions may greatly increase the proportion of cases where diarrhea is present, but on the average, I have noted its existence in at least 15 per cent of individuals afflicted with coloproctologic disorders. Permit me to present them in the order of their frequency as they have been encountered in proctologic practice together with a very brief outline of the treatment indicated.

1. *Diarrheas caused by the ingestion of improper foods or drink, coupled with other indiscreet habits which may produce a mechanical irritation of the intestinal mucosa from pure bulk alone or by putrefactive and fermentative processes.* Under this heading may be added the diarrheas arising from foods lacking certain vitamins over a long period of time (pellagra, certain diarrheas of infants, etc.).

DIARRHEAS—PROCTOLOGIC

1. Improper foods (food poisoning, "ptomaine" poisoning—syn.)
 - A. Toxemia (botulism)
 1. Containing preformed bacterial toxins
 - B. Infection (food contamination)
 1. Containing bacterial (Salmonella group; streptococci and staphylococci)
2. Alcohol (poor grade or overindulgence)
 - A. Beer, wines, whiskey
3. Pellagra (deficiency diet)

TREATMENT—DIARRHEAS

1. 2. *Improper Foods and Liquids*

Absolute rest in bed; induce vomiting; hot oil enemas (repeated); heat to abdomen; opiates for relief of pain and diarrhea; retain water balance (diet).

3. *Food Deficiency* (avitaminosis, allergy)

Place patient in good hygienic surroundings. Give good, nourishing foods and tonics to improve general health.

2. *Diarrheas due to invasions and infection of the bowel wall by certain organisms which are of bacterial or protozoal origin.* My own experience has been most commonly with the Entamoeba histolytica of amebic dysentery whereas the Sonne (Sonne-Duval) and Flexner types of Bacillary dysentery have been found far less frequently. Certain protozoal flagellates as the Giardia intestinalis and Trichomonas hominis (more so) have occasioned much diarrheal discomfort but systemic effects were practically nil in comparison to the other acute dysenteric infections. When the obstinate diarrhea of intestinal tuberculosis is present, there is evident ulceration of the colon and the disease is already very extensive if not terminal. Mention must here be made of the severe diarrhea, resem-

<i>Dysentery</i>	<i>Amebic</i>	<i>Bacillary</i>
As usually seen	Chronic endemic disease.	Acute epidemic tendency (Shiga, Flexner, Sonne (Sonne-Duval, Sonne-Kruse)).
Incubation period	Lengthy—2 to 7 weeks.	Short—5 to 7 days.
Stools	Offensive, blood, mucus in lesser amount, usually not so numerous but more copious.	Odorless, much jelly-like mucus and bright blood. Numerous but small amounts.
Sigmoidoscopy	Small ulcerations with hemorrhagic margins—intervening areas—usually not inflamed. Scrapings for vegetative and cystic forms best for diagnosis.	Painful and dangerous in acute stage; much rigidity of bowel wall. Ulcers, when visible, usually serpiginous outline with margins ragged and undermined. Swabbing for bacterial study.
Carriers	In some parts of U. S. high as 10% (C. F. Craig). Danger—spread of disease, isolation necessary until bowel mucosa healed.	Danger—spread of disease; isolation necessary until no mucus passed in stools.
Prophylaxis	General sanitation; pure water supply and proper food protection from flies and carriers. Proper dental care, watch and treat early nose and throat ailments.	Same as amebic dysentery.
TREATMENT	<p>Bed, Diet, Fluids—</p> <ol style="list-style-type: none"> Emetine (hypo) — gr. $\frac{1}{2}$ b.i.d. 4-6 days. Caps. Carbarson — gr. iv b.i.d.—10 days. Cap. emetine & bismuth iodid. gr. 1 (until 20 gr.). Yatren gr. iv t.i.d.—doses until 10 Gm. <p>Retention enemas (per rectum): Carbarson 2 Gm. in 200 c.c. N/saline sol. Yatren 5 Gm. in 200 c.c. warm water (repeated daily for 7-10 days). Precede each retention enema with cleansing enema of 2% sod. bicarb. in pint warm water.</p>	<p>Bed, low residue and high caloric diet, force fluids. Antidisenteric serum (60-80 c.c. every 36 hrs.)</p> <p>Preliminary purge of castor oil $\frac{1}{2}$-1 oz. and paregoric 2 c.c. (repeated). Calomel gr. $\frac{1}{2}$—hr. 10 doses, repeat on 3 successive days.</p> <p>Castor oil or citrate of magnesia or sod. phosphates (repeated) Appendicostomy?</p>

bling that of true cholera, observed in certain cases of subtertian malaria which often have a fatal ending. Chronic (non-specific) ulcerative colitis and less frequently ileitis (regional) may provoke diarrheas of varied duration and degree, although not dependent on the extent of the destructive processes involving the mucosal lining. Asiatic cholera I have never seen, but typhoid fever, etc., localized chiefly in the small bowel is not to be forgotten as the cause oftentimes of slow oncoming diarrheas.

DIARRHEA—TREATMENT—PROTOZOAL INFESTATION

Giardiasis—Atabrine (Quinacrine) gr. 1½ (0.09) t.i.d. (mouth)—5 days.
Skip one week—repeat.

Similar dosage used in malarial dysentery and in Trichomonas hominis (flagellate) infestation.

Also: a. Calomel gr. v at 9-10-11 p. m. night before. Mag. Sulph. oz. 1 at 7 a. m.—following morning.

b. Neoarsphenamine Gm. .5 intravenously: oftentimes with a.

Diet: a. Complete fast two days—complete milk diet.

b. Complete meat only—1 week for cure (?).

CHRONIC ULCERATIVE COLITIS—ILEITIS

1. Rest in bed.
2. Diet—non-irritating, high caloric, low residue.
3. a. Autogenous vaccine therapy.
b. Therapeutic test—emetine and carbarsone—in negative stool or scrapings for entamoebae.
c. Antidisentery serum.
4. Drugs
a. Mild purge (onset)
b. Kaomin—bismuth—ferrous sulphate
c. Codeine and atropine
d. Calcium compounds
e. Retention enemas—5% bismuth subgallate in olive oil oz. viii.
f. 5% silver nitrate sol. locally to ulcerations (rectum).
5. Surgery: Ileostomy, colostomy, stage resections, etc.

3. *Diarrheas due to anatomic derangements or lesions in which diverticula, polyps, and malignancies are the principal factors.* Biopsy and pathologic examination is done routinely whenever possible. The definite recognition of malignancy may at times require several specimens from different areas of the growth; furthermore, the presence of a malignancy may at times be masked where other disease, such as diverticulosis or a type of dysentery is likewise present. The often found non-malignant granulomas, where dysenteric infection is suspected but not proven, may completely disappear under proper therapeutic measures. The ulcerative lesions and strictures of lymphopathia venerea, diagnosed by the well known

Frei test, may produce marked diarrhea in the earlier stages, but our treatment, even with the palliative colostomy, certainly has been most discouraging. A marked tenesmus may be confused by the patient for a diarrhea because of the frequent although ineffectual calls to stool resulting almost solely in the passage of flatus with only occasional diarrheal evidence in the small amount of mucus-pus-blood discharged.

4. *Diarrheas are often seen in the presence of foreign body in the rectum, the most common of which is fecal impaction.* Frankly speaking, this condition should not be permitted to occur, but failure on the part of both doctors and nurses to make an occasional digital examination with the gloved finger, particularly in chronic cases of long standing, in postoperative convalescent periods, or where barium study has been permitted,—will account for the majority of them. There is no reason why our nurses should not be trained always to insert the gloved finger into the rectum where repeated enemas given by them return clear. Should modesty forbid that they do this, they should immediately notify the physician in charge, instead of continually posting on the chart the words "enema ineffectual."

5. *Various nervous influences* may provoke marked diarrhea and it is only by our careful study of the individual case that we can determine the cause. Business and financial worries during the past decade have produced many mild but long continued diarrheas particularly in the male sex, requiring marked ingenuity and psychologic persuasion on our part for the readjustment of these patients' ordinary business routine, habits, etc. While allergic and inflammatory conditions have been presented as causal in mucosamembranous colitis (ofttimes called mucous and spastic colitis) the neurogenic factor appears more logical. When irregularities in anyone's mode of living continue over a variable period of time, bowel irritability is bound to follow particularly in the presence of an unstable nervous system. However, in these cases, constipation is more commonly seen than a diarrhea. Various phases of advanced lues, tumor of the cord, traumatism to the spine from injury, or visceral reflexes (as in gallbladder or renal colic) may initiate diarrheas and proctologic consultation is requested. Diagnostic interpretation is oftentimes simplified by our sigmoidoscopic findings, reporting the presence, or not, of any existing lesion accountable for the diarrhea.

6. *Diarrheas may manifest themselves during the treatment of some diseases when overdosage or prolonged administration of certain medication is permitted, notably arsenic and mercury or the promiscuous use of the much overrated mineral oil preparations.* Diarrheas are frequently very evident in septicemia, leukemias or

HELMINTHS—(a) CESTODES

1. *Taenia saginata* or beef tapeworm (more common in U. S.)
2. *Taenia solium* or pork tapeworm (more common in Europe).
3. *Diphyllobothrium latum* or fish tapeworm (more common—Northern Europe).

HELMINTHS—(b) NEMATODES

1. *Oxyuris* (pin worms)—so frequently seen (especially children).
2. *Ascaris lumbricoides* (large round ground worm).
3. *Uncinariasis* (hookworm)—Southern U. S.
4. *Strongyloides stercoralis* (like the hookworm). (Known as tropical diarrhea—Southern U. S.).
5. *Trichuris Trichiura* (whipworm)—U. S.
6. *Trichiniasis* (from eating improperly cooked pork, containing encysted larvae).

HELMINTHS—(c) TREMATODES (FLUKES)

(Involve venous system of animals and man)

1. Liver

- a. *Fasciola hepatica*—inhabits bile ducts (sheep).
- b. *Clonorchis sinensis*—inhabits bile passages of domestic cat and dog. (Far East.)

2. Bladder—Rectum

a. Schistosomiasis (Bilharzial dysentery)

1. *Schistosoma haematobia* (Bilharzia haematobia). (Blood fluke found particularly around the veins of bladder and rectum. Imported cases from Far East met in U. S.).
2. *Schistosoma Mansoni* (Bilharzia Mansoni). Involves the rectum chiefly and the rectal mucosa may become very vascular and oedematous. The rectum may show numerous polypi which are loaded with the eggs of this parasite and prolapse of the rectum frequently occurs. (Africa, West Indies, Central America).
3. *Schistosoma Japonica* (Bilharzia Japonica). (Cats, pigs, dogs, cattle—Far East).

thyroid disease, but proctologic consultation is rarely necessary and mere mention of the condition should suffice.

7. Today we are frequently confronted with disturbing diarrheas due to the *very active use of radium or deep x-ray therapy*, following treatment of advanced malignancies in organs adjacent to the rectum which results in what is known as "factitious proctitis." A similar inflammatory reaction to the intestinal mucosa may ensue where panhysterectomy, colostomy alone or colostomy with extirpation of the rectum has been performed and intense deep roentgen therapy is applied in the belief that some evidences of malignancy still remain following operation.

8. *Parasitic infestation*, other than that mentioned heretofore may give rise to diarrheas of varying intensity. Proctoscopic examination is helpful but the diagnosis is usually the result of finding the parasites or eggs in the stool.

I have probably wearied you by mentioning in some detail important parasites which more frequently inhabit the small intestine, aside from those found in the colon; nevertheless the severe and oftentimes bloody diarrheas which many of them may occasion must be borne in mind and should leave its imprint on us. I am convinced that intestinal infestation is far more frequent than we believe and certainly greater than our diagnostic efforts have proven. It is urgent that we always bear in mind the possible presence of such parasitic invasion. In many of these conditions, diarrhea may be a very early and transitory symptom but its presence should demand thorough investigation. Whenever suspicion exists, prophylactic measures must be immediately taken to prevent its spread by definite and radical disposition of patient and the evacuations.

In presenting this paper I have attempted to call to your attention the frequency of a very common and disturbing symptom encountered in proctologic practice and, with certain diseases, given a brief resume of best possible treatment. I have also mentioned some conditions which you or I may never see, but their occasional presence in this country should put us on our guard. It has not been my intention to invade the lair of the gastroenterologist whose cooperation is so often helpful in proctologic practice, but I have requested the aid of competent pathologists who have at least a fair knowledge of parasitology and insisted upon proper interpretive findings by capable roentgenologists when the colon was at fault. Again let me remind you to regard all changes in bowel habit with far more suspicion than heretofore and never to rely entirely on certain routine symptomatology for our diagnoses. While diarrhea may be a prominent symptom in the first four or five cases of dysentery or malignancy you meet, the next one is liable to complain of some other distressing symptom. Only by careful history taking (which unfortunately in late years has become too routine and overloaded with unnecessary data), together with thorough and complete physical examinations including sigmoidoscopic study, can we hope to reach that degree of proficiency when we can say to those patients afflicted with coloproctologic disease,—why did you not consult us earlier? You alone are to blame!

The Southern Surgeon

Published Monthly by

The SOUTHERN SURGEON PUBLISHING COMPANY

701 Hurt Building

ATLANTA

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Editor

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Managing Editor

Subscription in the United States, \$5.00

VOLUME IX

JUNE, 1940

NUMBER 6

THE TEXAS SURGICAL SOCIETY: An Appreciation

When one thinks of the Lone Star State, one thinks of a vast territory, equal in size to many of the smaller nations of the earth, of endless plains, roaming cattle, waving grain and pasture lands, cotton fields beyond comprehension, oil wells and refineries, lumber mills, shipping, rich acres bearing the finest citrus fruits in the country, rapidly growing cities, and a healthy, wholesome, law-abiding citizenry. It is indeed an unique and marvelous state.

Astonishing though it seems, most of this development has taken place within the past twenty-five years. Before that time, the immense possibilities of the land were generally unsuspected. Then, here and there men with vision appeared and started the work of organization and development. The outcome has been truly phenomenal in every field of industry.

Progress in medicine and surgery has kept pace with progress in other activities, and has likewise made its major strides within the past twenty-five years. A real impetus to surgical advancement was initiated in 1915 with the organization of the Texas Surgical Society by a few forward-looking and enthusiastic specialists in surgery from various parts of the state. This group, which comprised only twenty-one members, held its first meeting in San Antonio in October, 1915. It is good to know that nine of the original membership, Drs. Kenneth H. Aynesworth, Frank L. Barnes, Frank C. Beall, Harold M. Doolittle, Howard R. Dudgeon, James W. Hale, John T. Moore, Arthur C. Scott and Charles S. Venable, are still living and taking an active interest in the organization.

The first president of the Texas Surgical Society was Dr. James E. Thompson, a man of exceptional attainments, and with a rare understanding of the needs of the day, as well as a remarkable insight into the future of medicine and surgery. I was interested in reading Dr. Thompson's presidential address, delivered at the first meeting of the society, wherein he forcefully brought out the need for more specialists in surgery, for better surgical training in both schools and hospitals, and for higher standards of surgical practice in hospitals. All the things he advocated and prophesied at that time have come to pass, even more fully than he imagined. It is to the influence of such men as he that we must attribute the high standardization of both hospitals and surgeons today. Undoubtedly, he was also largely instrumental in formulating the lofty professional and ethical principles upon which the Texas Surgical Society was established, and which every succeeding president has upheld in an admirable manner.

On April 2, 1940, the Texas Surgical Society celebrated its twenty-fifth or Silver Anniversary in Dallas. It was my privilege to be able to attend that meeting, to enjoy the fellowship of the members, and to observe some of the things they are doing along scientific lines. The Society now has one hundred members, all of whom confine their practice exclusively to surgery. From the standpoint of ability and achievement, there are no better surgeons in the country; I was profoundly impressed with the excellent papers presented at the scientific sessions. In their personal contacts they exhibit a spirit toward each other so fine and friendly that it is a joy to be among them. An example of this spirit was shown in the dinner given in honor of the nine surviving charter members, at which a beautiful gold medal was presented to each. In fact, to an outsider, the broad boundaries of the state itself seemed typified in the broad-minded, unselfish, cooperative and genial atmosphere which pervaded the entire gathering.

It was as an official representative of The Southeastern Surgical Congress that I attended the meeting to discuss with the members of the Texas Society the matter of having their papers published in THE SOUTHERN SURGEON. They unanimously agreed that a reciprocal relationship between the two organizations was desirable, and it was therefore decided that the papers presented before the Texas Surgical Society would be published in the SURGEON after being submitted to an editorial board of the Texas Society in conjunction with a similar board chosen from our own membership.

This appears to be a most fortunate arrangement. In the first place, readers of THE SOUTHERN SURGEON everywhere will have the advantage of the papers written by the Texas surgeons. Fur-

ther, the connection should stimulate a closer association between the Southwestern and Southeastern groups, which should be profitable to both from a personal as well as a professional viewpoint. I am sure that every member of The Southeastern Surgical Congress is looking forward to many years of a cordial mutually beneficial relationship with the members of the Texas Surgical Society.

R. L. SANDERS, M. D.

NOTE:

With characteristic modesty Dr. Sanders does not divulge that when he was President of The Southeastern Surgical Congress it occurred to him that a coalition of this Congress and the Texas Surgical Society in sponsoring THE SOUTHERN SURGEON would be to the best interests of both organizations and of the journal. He took up the subject with the officials of that Society, and, as President of the Congress, helped work out a proposition that met with the approval of both.

The Editor.

BOOK REVIEWS

The Editors of THE SOUTHERN SURGEON will at all times welcome new books in the field of surgery and will acknowledge their receipt in these pages. The Editors do not, however, agree to review all books that have been submitted without solicitation.

TREATMENT OF CANCER AND ALLIED DISEASES. By One Hundred and Forty-Seven International Authors. Edited by GEORGE T. PACK, B. Sc., M. D., F. A. C. S., Attending Surgeon, Memorial Hospital, New York; Assistant Professor of Clinical Surgery, The School of Medicine, Yale University, New Haven, and Cornell University Medical College, New York, and EDWARD M. LIVINGSTON, B. Sc., M. D., Associate Visiting Surgeon, Bellevue Hospital; Assistant Clinical Professor of Surgery, New York University College of Medicine; Assistant Attending Surgeon, Memorial Hospital, New York; Formerly, Visiting Surgeon, New York City Cancer Institute. In three volumes with 1,500 illustrations. Price, \$36. New York and London: Paul B. Hoeber, Inc., Medical Book Department of Harper & Brothers, 1940.

This great work is jointly dedicated to James Ewing for his outstanding leadership in cancer research, his continual encouragement of co-workers, and his profound influence in enhancing the recognition of neoplastic diseases as a field of unified special endeavor; and to the late George David Stewart for his steadfast devotion to the cause of medical education, his high professional attainments, and unique personality, still a perpetual source of inspiration to all who knew him.

The first chapter of this work is by James Ewing and deals with the prevention of cancer. Then in logical order each chapter discusses every phase of cancer and the allied diseases, grading of cancer, biopsies and the different types of treatment for various types of cancer in or on every part of the anatomy. The work is so complete the reviewer can not attempt to give a full review. It is unquestionably the greatest work on the treatment of cancer that has ever been written.

B. T. B.

AN INTRODUCTION TO GASTRO-ENTEROLOGY. Being the Third Edition of *The Mechanics of The Digestive Tract.* By WALTER C. ALVAREZ, M. D., Professor of Medicine, University of Minnesota, The Mayo Foundation, and a Senior Consultant in the Division of Medicine, the Mayo Clinic; Author of "Nervous Indigestion." 778 pages, with 186 illustrations. Price, \$10. New York and London: Paul B. Hoeber, Inc., Publisher, 1940.

It is always a pleasure to pick up something from the facile pen of Walter Alvarez, who has appeared in the pages all too infrequently. One must quote a sentence from the preface because it is so in harmony with the editorial policy of *THE SOUTHERN SURGEON*, "I want to help young men to get oriented quickly, so that those with a gift for research can start off intelligently and on good problems in their youth, when they are full of enthusiasm and new ideas, and most likely to do big things." In doing this he gives many most helpful guides to the literature of physiology and gastro-enterology.

The busy clinician who wants to learn in a hurry how to determine whether old Mr. Jones has a benign ulcer or a cancer of the stomach or how to cure an antiquated virgin's indigestion right now, won't find what he seeks in this rather large volume. The man however who wants to grasp the fundamentals of why the gastro-intestinal tract works as it does will be pretty apt to find what he wants here—and if he is very busy he can content himself with reading

the summary at the end of each chapter. This emphasis on physiology is another plank in this journal's platform. Certainly the surgeon who operates on the alimentary canal will be able to do so more efficiently if he goes at it in an attempt to restore its normal physiology, and he can't attempt to restore what he himself doesn't understand.

In spite of the large amount of experimental data, the accumulation of scientific facts, the many somewhat involved theories presented, the book was written by a man who is pre-eminently a clinician, and his hard common sense, his practical experience and his delightful style are evidenced on every page.

It is very hard to find any fault with this book, but since that seems to be one of a critic's duties: Several times Dr. Alvarez likens the present state of gastro-enterology to that of cardiology forty years ago—i. e. before the invention of the electrocardiograph. One cannot believe that the author of that medical classic, "Nervous Indigestion" (the reviewer is glad to learn that it is not out of print), can look forward to the invention of a gadget in his field to justify a paraphrase of that famous dictum, "A 'heart specialist' is a man who owns an electrocardiograph but who doesn't know a damned thing about the heart."

CLINICAL ROENTGENOLOGY OF THE ALIMENTARY TRACT. By JACOB BUCKSTEIN, M. D., Visiting Roentgenologist (Alimentary Tract Division), Bellevue Hospital, New York City; Consultant in Gastro-Enterology, General Islip Hospital. 652 pages, with 525 original illustrations. Price, \$10. Philadelphia and London: W. B. Saunders Company, 1940.

Dr. Buckstein has written an admirable book based on his experience in roentgenology of the alimentary tract during more than twenty years at Bellevue Hospital together with his private practice. It is suitable not only for the experienced roentgenologist, but also for the surgeon, internist and general practitioner.

Roentgenology after all is a young branch of diagnosis. There must be a temptation to cover its history in detail, but the author has resisted this temptation and has only sketched enough history to be thoroughly interesting.

He disclaims the attempt to present a roentgenologic atlas. While the book may well serve as that, for the x-ray plates reproduced are both splendid and profuse, it is much more. He does not give such technical details as voltage, amperage and length of exposure, nor does he tell how to develop a plate, but he does describe fluoroscopic technic, and he does go into the position of the patient and tell how often, for example, one should make exposures after a barium meal.

Having included the word "clinical" in his title, one might have feared the author would stray far afield. To the contrary, he sets forth that the roentgenologist must be primarily a physician, a diagnostician who, while his principal dependence is on the x-ray, must also consider other factors. In so doing he serves to impress those of us who are not roentgenologists with the occasions when we need the help of such a specialist. He gives abstracts of many cases, which not only add interest but also help to drive home his points. He does not undertake to outline medical treatment when that is indicated, but often he does give us operative findings and photographs of gross and microscopic specimens. He emphasizes, as did Dr. Carman many years ago, that the x-ray man's duty is not confined to interpreting the plates, but he should follow those patients who come to surgery, through their operations.

The book is singularly complete: it includes lesions from the esophagus to the rectum, including the liver, gallbladder, pancreas and spleen. It is clearly written and it betrays, without ostentation, that Dr. Buckstein knows his stuff and is a man of well seasoned and excellent judgment.

Lest the reviewer be accused of writing merely an uncritical blurb, he would register two kicks: In Chapter II, discussing the appearance of a normal, barium-filled esophagus in the right anterior oblique view he says "At times it may be possible to see three backward curves from above downward: (1) the aortic impression, (2) the pulmonary artery impression, and (3) the left auricular impression." In his own plates the second impression is clearly shown to be due to the left main bronchus, and the pulmonary artery, at least the artery to the left lung, is with equal distinctness shown in the axial view in front of the bronchus. The reviewer's second objection is to the repeated use of the term "tubercular peritonitis." "Tubercular" means "nodular": here's hoping the second edition will say "tuberculous peritonitis." However, Dr. Buckstein's excellent discussion of the role of the roentgenologist in the diagnosis of "chronic appendicitis" more than compensates for the second objection.

L. M. B.

THE HOSPITAL CARE OF NEUROSURGICAL PATIENTS. By WALLACE B. HAMBY, M.D., F.A.C.S., Associate Professor of Neurology and Instructor in Surgery (Neurological Surgery), University of Buffalo School of Medicine, Buffalo. 118 pages, with 24 illustrations. Price, \$2. Springfield and Baltimore: Charles C Thomas, Publisher, 1939.

This admirable little book is written for both interns and nurses, and it is so well written that the intern won't be insulted nor will the nurse be bewildered. The first chapter could well be recommended to all house officers to memorize. The rest has little to do with the general services. The book should prove of unspeakable value to boys entering a neurosurgical service.

ORTHOPEDIC OPERATIONS: INDICATIONS, TECHNIQUE, AND END RESULTS. By ARTHUR STEINDLER, M. D., F. A. C. S., Professor of Orthopedic Surgery, The State University of Iowa, Iowa City, Iowa. 766 pages, with 865 illustrations on 322 figures. Price, \$9. Springfield: Charles C Thomas, Publisher, 1940.

When David was preparing to meet Goliath he declined Saul's armor and accoutrements, preferring to trust to the means that had already proved successful in his hands. In spite of this excellent example many men who set to work to write a book on surgery will load it up with descriptions of just about every operation that has ever been devised or even suggested. Dr. Steindler on the other hand has profited by David's example, and he has almost limited himself to those operations he has personally performed, with more or less satisfactory results; at the same time he is careful to explain that he has heard of a lot more than he describes. The result is that he has produced a book that should prove of really practical value to every surgeon who performs orthopedic operations.

The first section deals with general surgical principles and stresses the importance of the patient as a whole. In this section he discusses biology, physiology, chemistry, vitamins and mechanics. The second section gives the details of the operative procedures. A well seasoned teacher, he writes simply and

clearly: with the text and the large number of excellent original illustrations one is left in no doubt as to exactly how he should perform the operation. He goes on to give results of the various types of surgery, often citing statistics from other reliable sources as well as those from his own clinic. The third part presents "the precise clinical situations in which these operations are to be applied."

It is hard to pick out any particular parts of this book for commendation because of its general excellence, because all of it portrays the skill, the integrity and the experience of the author.

ARTIFICIAL PNEUMOTHORAX: Its Practical Application in the Treatment of Pulmonary Tuberculosis. Contributions by Saranac Lake Physicians to the Studies of the Trudeau Foundation. Editorial Committee EDWARD N. PACKARD, M. D., JOHN N. HAYES, M. D., and SIDNEY F. BLANCHET, M. D. 300 pages, with 85 illustrations. Price, \$4. Philadelphia: Lea & Febiger, 1940.

There was a day when the diagnosis of pulmonary tuberculosis (which is still too often made long after it should be) meant that the poor patient was sent off to a sanatorium, either publicly supported or privately run. If he could not secure admission to a sanatorium it was just too bad, his family doctor would drop in from time to time, to cheer him up, emphasize the importance of rest, food, milk, raw eggs and cod liver oil, and to express the hope that he would recover. Some did, but whether they did or not it was no concern of a surgeon. That day, thank God, is past, and today surgery, perhaps by means of the very major thoracoplasty, is restoring many persons to lives of usefulness. It therefore gives us particular pleasure to recommend to all this splendid contribution from the Saranac Lake group.

This book takes up every phase of artificial pneumothorax, the selection of cases, the technic, the accidents that may be encountered, the length of time it should be maintained and the results to be expected. In passing, the authors admit many tuberculous patients will recover without pneumothorax, but on account of the difficulties in selecting those patients they feel that it should be pretty generally employed; even in far advanced cases it may help to lessen the spread of tubercle bacilli. They also discuss the severing of pleural adhesions and, briefly, the more radical measures of collapse therapy. Careful study of this book should enable any physician to recognize the indications for pneumothorax and to institute it, and should also suggest to him the need for more extensive procedures.

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References should conform to the style of the Quarterly Cumulative Index Medicus, published by the American Medical Association. This requires, in order given: name of author, title of article, name of periodical, with volume, page, month (day of month if weekly) and year.

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The Southern Surgeon is now published monthly. Subscription price in the United States and Canada: \$5.00; in other countries: \$6.00, including postage. Single Copies, \$1.00 postpaid.

Checks may be made payable to The Southern Surgeon Publishing Co.

